



Nobis Engineering, Inc. | New Hampshire | Massachusetts

EPA Region 1 RAC2 Contract No. EP-S1-06-03

October 11, 2011  
Nobis Project No. 80022

Via Electronic Submittal

U.S. Environmental Protection Agency, Region 1  
Attention: Mr. Daniel Keefe, Task Order Project Officer  
5 Post Office Square, Suite 100  
Boston, Massachusetts 02109-3919

Subject: Transmittal of the Final Groundwater Monitoring Data Summary  
Nyanza Chemical Waste Dump Superfund Site – OU2, Ashland, Massachusetts  
Remedial Action  
Task Order Number 0022-RA-RA-0115

Dear Mr. DiLorenzo:

Attached with this correspondence is the Final Groundwater Monitoring Data Summary for the Remedial Action efforts at the Nyanza Chemical Waste Dump Superfund Site, Operable Unit 2 located in Ashland, Massachusetts.

Should you have any questions or comments, please contact me at (603) 724-6238, or by email at jmccullough@nobiseng.com.

Sincerely,

NOBIS ENGINEERING, INC.



Jeff McCullough, P.E.  
Senior Project Manager

Enclosure

c: File 80022/NH

# Groundwater Monitoring Data Summary

## **Nyanza Chemical Waste Dump Superfund Site – OU2 Ashland, Massachusetts**

Remedial Action  
EPA Task Order No. 0022-RA-RA-0115

### **REMEDIAL ACTION CONTRACT No. EP-S1-06-03**

FOR

**US Environmental Protection Agency  
Region 1**

BY

**Nobis Engineering, Inc.**

**Nobis Project No. 80022**

**October 2011**

**U.S. Environmental Protection Agency**

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## **1.0 INTRODUCTION**

Nobis Engineering, Inc. (Nobis) prepared this Groundwater Monitoring Data Summary Report (Report) for the Nyanza Chemical Waste Dump Superfund Site, Operable Unit II (Nyanza OU2) located in Ashland, Massachusetts (Figure 1-1). This work was performed in accordance with the United States Environmental Protection Agency (EPA) Region I Remedial Action Contract 2, No. EP-S1-06-03, EPA Task Order No. 0022-RA-RA-0115, Amended Scope of Work (ASOW) dated March 23, 2010, Work Plan Amendment (WPA) No. 2 (Nobis, 2010a).

### **1.1 Objective**

The Task Order objective is to implement a final Remedial Action (RA) for the Nyanza OU2 (the Site) that eliminates, reduces, or controls risks to human health and the environment. More specifically, the Task Order contemplates the recovery of dense non-aqueous phase liquid (DNAPL), and the purpose of Amendment No. 2 is to expand the scope of groundwater monitoring.

The objectives of the ASOW are:

1. Confirm the locations and evaluate the condition of approximately 31 existing groundwater monitoring wells located throughout the Site;
2. Install five staff gauges along the east bank of Mill Pond;
3. Conduct a synoptic groundwater sampling round with potentiometric measurements and analytical testing in the 31 wells; and
4. Develop and submit a report with findings.

Because it had been several years since synoptic water levels were measured (ICF Consulting [ICF 2004], Fall, 2003), Nobis and EPA developed a list of monitoring wells to locate in the field and assess their suitability for gauging and sampling activities. Nobis personnel located the wells proposed for sampling on December 20 and 21, 2010. Previously-existing staff gages SG-1 through SG-5 were located on April 18, 2011; therefore, no additional gages were installed along the east bank of Mill Pond.

This Groundwater Monitoring Data Summary Report summarizes the above activities, evaluates the analytical data collected during January 2011, compares the analytical results to the Massachusetts Department of Environmental Protection (MassDEP) Massachusetts Contingency

Plan (MCP) GW-1 and GW-2 standards for organic contaminants, and assesses the nature and extent of groundwater contamination at the Site. A comparison is also made to the last synoptic round of groundwater monitoring data collected by ICF in 2003 (ICF, 2004).

## 1.2 Report Organization

This report contains four sections:

- **Section 1** describes the Site and summarizes previous investigations, including the 2010 Step Drilling Program;
- **Section 2** presents a description of groundwater sampling activities;
- **Section 3** presents the analytical results for groundwater and an evaluation of the results; and
- **Section 4** presents an overall summary and recommendations for further activities.

## 1.3 Site Location and Background

The former Nyanza facility is located on the north side of Megunko Road in the Town of Ashland, Middlesex County, Massachusetts (Figure 1-1). The current Site study area includes areas where chemical wastes released from the former Nyanza facility have come to rest and have not yet been remediated including shallow and deep plumes of groundwater contamination located south and west of the former Nyanza facility and areas of contaminated sediment located in the Sudbury River. The Town of Ashland is located 25 miles west-southwest of Boston, and 20 miles east-southeast of Worcester, Massachusetts.

From 1917 to 1978, manufacturing operations at the Nyanza facility produced textile dyes, dye intermediates, and other products. The last business on the Site, Nyanza, Inc. operated from 1965 to 1978 before declaring bankruptcy in 1978. The Site was subsequently listed on the EPA National Priorities List (NPL) in 1983 and the first Record of Decision (ROD) was signed in 1985 describing the remedy of contaminant sources in the Megunko Hill area (e.g., the former Nyanza facility and landfill); this became known as Operable Unit (OU) 1. Other OUs include contaminated groundwater and vapor intrusion (OU2), drainage ways between the former Nyanza facility and the Sudbury River (OU3), and a 26-mile stretch of the Sudbury River from the Nyanza Site to its confluence with the Assabet River in Concord (OU4).

The Megunko Hill Area was used for surface and sub-surface disposal of chemical sludges, process wastes, and debris. Sludges containing high concentrations of heavy metals, aromatic amines, and volatile organic compounds (VOCs) were dried in beds and the drained chemicals eventually migrated to wetlands. The low-lying industrial area was also used for the disposal of heavy metal sludges and organic solvents in lagoons and/or an underground vault. The vault was also used as a rudimentary settling system for the discharge of waste process liquids. The western wetland, also known as the Area C Wetland, was found to contain wastewater treatment sludge and contaminated sediment from runoff originating at Megunko Hill. The Trolley Brook Wetland, also known as Area G Wetland, received septic waste effluent from settling lagoons as well as runoff from Megunko Hill. These operations allowed contaminant migration from the former Nyanza facility to a collection of wetland areas and drainage culverts and outfalls, and into the Sudbury River.

A number of VOCs, semi-volatile organic compounds (SVOCs), and metals have been detected in soils and groundwater at the Site. The most common VOCs have historically included chlorobenzene, 1,1-dichloroethene (DCE), and trichloroethene (TCE). The principal SVOCs include 1,2,4-trichlorobenzene (TCB), dichlorobenzenes (DCB), aniline, naphthalene, and nitrobenzene. The principal metals have included antimony, beryllium, cadmium, iron, lead, manganese, mercury, nickel, sodium, and thallium. A limited area of dense non-aqueous phase liquid (DNAPL) was occasionally observed in certain wells that were screened across the top of bedrock and located just down gradient of the former underground vault.

Past remediation and restoration activities have included the excavation of the underground vault; capping lagoons and sludge pits; creating cells within the cap for disposal of contaminated soils and solidified sludges; and the formation of a groundwater and surface water diversion trench upgradient of the landfill. Other remediation and restoration activities included the excavation and disposal on site of approximately 45,500 cubic yards of mercury-contaminated sediments from the Eastern Wetland, Trolley Brook, and Outfall Creek/Lower Raceway; the restoration of all excavated and impacted areas; and the replacement of 1,300 feet of waterline along Megunko Road. Additionally, in the mid-1990s, a pumping test by Ebasco Services, Inc. to support a pump and treat system design was halted when DNAPL and a DNAPL emulsion were pumped from a bedrock well located behind the Worcester Air Conditioning (WAC) building, located downgradient and immediately north of the former underground vault. Also, in 2007, a total of 43 vapor mitigation systems (VMS) were installed in certain Ashland residences

which are located over the most concentrated portions of the shallow groundwater VOC plume. The VMS are currently inspected and maintained by MassDEP.

Between 2008 and 2010, Nobis conducted periodic monitoring and measured depth to groundwater, total well depth, depth to DNAPL, and DNAPL thickness as applicable. If DNAPL was encountered, a bailer was lowered into the well in an attempt to recover a sample and to visually determine DNAPL thickness.

#### **1.4            2010 Step Drilling Program**

Nobis performed an exploratory drilling program to locate additional sources and/or locations where DNAPL might be present for the purpose of installing DNAPL recovery well(s) as detailed in the 2006 Explanation of Significant Differences ([ESD], USEPA, 2006). The DNAPL recovery system was designed by the US Army Corps of Engineers (ICF, 2006) and EPA technical staff recommended an exploratory drilling program to locate DNAPL sources at or near the bedrock/overburden interface.

As detailed in the Draft Technical Memorandum for Step Drilling Program (Nobis, 2010b), seven soil borings (designated B1 through B7) were advanced on the Worcester Air Conditioning (WAC) and Nyacol properties between September 28 and October 15, 2009. Soil samples were collected for visual characterization and PID screening for the presence of DNAPL only (Figure 1-2). The investigation focused on the previously-identified bedrock depression located southwest of the WAC building between monitoring well MW-113A and the Boston and Albany Railroad right of way (ROW). Of the seven borings, two (B-6 and B-7) were advanced on the other side of the ROW at the Nyacol property located on Megunko Road, in the grassy area between the historical chemical vault and the ROW. One of the soil borings, boring B-5, was completed as a monitoring well (designated as B-5/MW) based on elevated PID screening results which indicated the possible presence of DNAPL.

The findings of the step drilling program were as follows:

- Soil at the WAC property consisted of a layer of fill at the surface, followed by outwash sand and gravel, lacustrine silty sand, glacial till, and bedrock. Bedrock was encountered

between 38.5 feet and 43 feet below ground surface (bgs) and borings were advanced up to 7.5 feet into bedrock at these locations.

- Soil conditions encountered in the two Nyacol property borings were similar to the WAC borings, other than a lack of noticeable outwash soil components.
- Solvent odors were noted by Nobis personnel during the advancement of borings B-1 and B-5; however, no DNAPL was observed in the soils or rock cores at either location.
- Elevated PID readings detected in the borings ranged from 5.9 parts per million (ppm) in boring B-6 to 518 ppm in boring B-5.
- Slug testing (performed at wells MW-113A and B-5) yielded hydraulic conductivities between 2.05 to 9.39 feet per day (ft/d) which are comparable to literature values for similar aquifers.

In October 2009, Nobis re-developed existing Site monitoring wells MW-113A, RW-1, RWS-1, P-1S, P-1B, P-2, P-4, and newly installed monitoring well B-5. During redevelopment of monitoring wells MW-113A, RW-1, RWS-1, P-1S, P-1B, P-2, P-4, and B-5, pressure transducers were installed in surrounding wells to identify any hydraulic connections between bedrock wells. No immediately observable connection between bedrock wells was identified during well development.

Based on the results of the step drilling program, Nobis made the following recommendations in the Draft Technical Memorandum (Nobis, 2010b):

- DNAPL can likely be removed from wells MW-113A, RW-1 and potentially well B-5 using product pumps with DNAPL level sensors. When sufficient DNAPL accumulates in the sump, the pump activates and continues until the low level shut off trips.
- Given an assumed DNAPL source to explain the existing dissolved phase groundwater plume, Nobis recommended a Site-wide synoptic groundwater sampling event to see if there are changes from the last round in 2003. These data would also support EPA's

evaluation of the ongoing vapor mitigation systems currently operating within the existing groundwater plume.

## 2.0 GROUNDWATER MONITORING INVESTIGATION

Groundwater gauging and sampling were conducted to characterize groundwater flow and the current nature and extent of groundwater contamination in the center of the Site. This is the first comprehensive groundwater monitoring investigation completed since 2003. The Nobis field activities for this task included mobilization, low-flow groundwater sampling, decontamination of equipment and personnel, and demobilization.

Groundwater samples were collected from 31 groundwater monitoring wells (Figure 2-1) between January 10 and 21, 2011. No field work was conducted on January 12, 2011 due to inclement weather. The groundwater samples and associated field quality control (QC) samples were collected, preserved, and submitted to the EPA's Region 1 Office of Environmental Measurement and Evaluation (OEME) in North Chelmsford, MA in accordance with the approved Quality Assurance Project Plan (QAPP) (Nobis, 2010c). Per the ASOW, the groundwater samples were analyzed for VOCs, SVOCs, total Target Analyte List (TAL) metals (including mercury), and anions (chloride, nitrate, nitrite, sulfate, nitrate as nitrogen, and nitrite as nitrogen). Total metals were analyzed using inductively coupled plasma optical emission spectroscopy (ICP-OES). Per the direction of EPA, newly installed micro wells MADEP-MW-01 and MADEP-MW-02 were also sampled but analyzed for VOCs only. Previous analytical results, performed by MassDEP, for these micro wells are included in Appendix C.

Table 2-1 presents a list of groundwater samples collected during the January 2011 sampling round, sample identification, dates of sample collection, and quality control (QC) designation (as appropriate). Table 2-2 presents monitoring well construction details for the wells sampled. Monitoring wells are classified as being overburden (OB) or bedrock (BR) wells based on where the screen area is located. Three monitoring wells (MW-4B, RW-1, and B-5) were constructed with screens straddling the overburden-bedrock interface and are designated as OB/BR. For groundwater elevation and chemical mapping purposes these three monitoring wells are reported as overburden wells.

## **2.1           Groundwater Elevations**

During the January 2011 sampling activities, depth to groundwater measured in overburden monitoring wells ranged from 1.45 ft bgs (MW-6A) to 13.41 ft bgs ((MW-201). The depth to groundwater measured in bedrock monitoring wells ranged from 3.26 ft bgs (MW-113A) to 8.46 ft bgs (MW-201). The measured depths to water and calculated groundwater elevations for all monitoring locations are in Table 2-1. As requested by EPA, a synoptic round of groundwater gauging was not conducted prior to the commencement of groundwater sampling activities. Individual groundwater wells were gauged just prior to sampling; therefore, the overburden and bedrock potentiometric surface contours are based on data collected between January 10 and 21, 2011.

Groundwater contours based on the overburden well gauging data (Figure 2-2) indicate flow in a north-northeasterly direction on the western portion of the Site, toward Mill Pond, and turning in a north and easterly direction on the eastern portion of the Site, toward the Sudbury River. Groundwater contours based on the bedrock well gauging data (Figure 2-3) indicate a similar flow direction, toward Mill Pond and the Sudbury River. These data are consistent with previous report interpretations (ICF, 2004), which indicated groundwater flow near the Site is towards the Sudbury River in the areas downstream of Mill Pond.

During the January 2011 monitoring round, DNAPL was measured in groundwater monitoring well MW-113A at a thickness of 1.5 feet. DNAPL was not found in any of the other wells gauged during the January 2011 monitoring event, including recently completed B-5 installed on the WAC due to the suspected presence of DNAPL.

## **2.2           Well Purging**

Prior to sampling, monitoring wells were purged and monitored until water quality parameters stabilized. Consistent with the EPA Region 1 low-stress purging and sampling procedures, samples were collected after stabilization to ensure that they were representative of aquifer conditions.

The groundwater monitoring wells were outfitted for sampling with dedicated Teflon or Teflon-lined polyethylene tubing left in the wells for future sampling events. Bladder pumps were utilized for purging and collecting a majority of the groundwater samples collected during the

January 2011 round. After a sample was collected, the bladder kit was removed, the pump decontaminated, and a new bladder kit installed before collecting the next sample. A pressurized nitrogen tank and control box allowed the sampler to adjust the flow rate.

Wells MW-107, MW-115A, MW-204, and MW-304A required the use of peristaltic pumps because bladder pumps could not be lowered through damaged stand pipes. Groundwater micro wells MA-DEP-01 and MA-DEP-02 also required a peristaltic pump because the diameter of these wells was too small to fit a standard bladder pump. The peristaltic pumps were activated at their lowest settings and the pumping rates were slowly increased, until discharge occurred. Pumping rates were adjusted to a suitable flow rate that minimized drawdown in the wells. The recorded pumping rates for the January 2011 low-flow sampling event ranged between 98 milliliters per minute (mL/min) and 340 mL/min.

The following water quality parameters were measured prior to sampling: temperature, pH, dissolved oxygen (DO), specific conductance, oxidation-reduction potential (ORP), and turbidity. The field data were recorded on Low-Flow/Low-Stress Groundwater Sampling Log Sheets (Appendix A) and summarized on Table 2-3. The water level, pumping rate, and water quality parameters were recorded every 5 minutes (or as appropriate) using YSI 650 MDS multi-parameter meters along with LaMotte 2020e turbidity meters (or equivalent). Stabilization was considered achieved, when three consecutive readings were within the following limits:

- Turbidity (10 percent or less than 5 Nephelometric Turbidity Units [NTU])
- DO (10 percent or less than 0.5 mg/L)
- Specific conductance (3 percent)
- Temperature (3 percent)
- pH (+/- 0.1 unit)
- ORP (+/- 10 millivolts)

### **2.3            Well Sampling**

During the January 2011 groundwater sampling round, samples were collected from the tubing directly into the sample containers. All samples were free of air bubbles or air pockets to minimize changes in the water chemistry upon contact with the atmosphere. All samples were sent to EPA's OEME Laboratory in North Chelmsford, Massachusetts for analysis. Analyses

were performed in accordance with the QAPP, and laboratory protocols. An equipment blank was collected from a non-dedicated bladder pump using deionized (DI) and high performance liquid chromatography (HPLC) water after decontaminating the bladder pump between sampling locations.

### **3.0 LABORATORY ANALYTICAL RESULTS**

Groundwater laboratory analytical results for VOCs, SVOCs, total TAL metals, and anions are presented in Tables 3-1 through 3-4, respectively. Section 3.1 summarizes the results and Section 3.2 assesses the data quality and limitations.

#### **3.1 Groundwater Analytical Data**

Consistent with data collected during previous sampling events, the January 2011 data show a similar distribution of VOCs, SVOCs, and metals in the overburden and bedrock groundwater at the Site.

##### **3.1.1 VOC Analytical Data**

Groundwater samples collected from 31 monitoring wells were analyzed for VOCs. The following VOCs were detected at concentrations exceeding the MassDEP GW-1 and/or GW-2 standards:

- **Benzene** was detected at concentrations exceeding the 5 µg/L GW-1 standard in samples collected from monitoring wells MW-201, MW-202, MW-203A, and MW-203B, and MW-302. The highest concentration of benzene, 67.6 µg/L, was detected in the sample collected from well MW-203A. All five wells show a decrease in benzene concentration compared to the 2003 data. No samples exceed the 2,000 µg/L GW-2 benzene standard. Samples with benzene exceedances were generally collected from the area south of Mill Pond, along the northeastern portion of the contaminant plume.
- **Chlorobenzene** was detected at concentrations exceeding the 100 µg/L GW-1 standard in the samples collected from overburden (OB) monitoring wells MW-113B, MW-201, MW-202, MW-203B, MW-302, and MW-304B; bedrock (BR) monitoring wells MW-107, MW-113A, MW-115A, MW-203A, and MW-304A; and overburden/bedrock wells RW-1

and B-5. The concentrations of chlorobenzene detected in the samples collected from wells MW-113A, MW-113B, MW-201, MW-202, MW-203A, MW-203B, MW-302, MW-304A, RW-1, and B-5, also exceeded the 200 µg/L GW-2 groundwater standard. The highest concentration of chlorobenzene, 17,000 µg/L, was detected in the sample collected from well MW-113B, located on the WAC property. This represents a dramatic increase in 2011 at this location and an order of magnitude jump from the 2003 maximum. Chlorobenzene concentrations that exceed the GW-1/GW-2 standards were detected in samples collected from two areas of the contaminant plume, consistent with other VOC contamination: the WAC property on the western portion of the contaminant plume and wells located on the north-central portion of the contaminant plume, south of Mill Pond.

- **Cis-1,2-DCE** was detected at concentrations exceeding the 70 µg/L GW-1 standard in the samples collected from overburden monitoring wells MW-06A, MW-201, MW-202, MW-203B, MW-302, and MW-304B; bedrock monitoring wells MW-107, MW-203A, MW-204A, MW-304A; and overburden/bedrock wells RW-1 and B-5. The concentrations of cis-1,2-DCE detected in the samples collected from wells MW-06A, MW-107, MW-202, MW-201, MW-202, MW-203A, MW-203B, MW-204A, MW-304A, MW-304B, RW-1, and B-5 also exceeded the 100 µg/L GW-2 standard. The highest concentration of cis-1,2-DCE, 450 µg/L, was detected in the sample collected from well MW-304A. This is an increased concentration at this location compared to 2003 but is still lower than the 2003 maximum (from a well not sampled in 2011). Samples with cis-1,2-DCE exceedances were collected from overburden/bedrock couplets located within the western and central portions of the contaminant plume and in both overburden and bedrock wells within the eastern portion of the plume.
- **TCE** was detected at concentrations exceeding the 5 µg/L GW-1 standard in the samples collected from: overburden monitoring wells MADEP-MW-1, MADEP-MW-02, MW-04B, MW-06A, MW-08, MW-113B, MW-201, MW-202, MW-203B, MW-302, and MW-304B;; bedrock monitoring wells MW-107, MW-112A, MW-113A, MW-115A, MW-203A, MW-204A, and MW-304A; and overburden/bedrock wells RW-1 and B-5. The concentrations of TCE detected in the samples collected from wells RW-1, MW-302, MW-304A, MW-304B, B-5, MADEP-MW-1, MADEP-MW-02, MW-107, MW-113A, MW-113B, MW-115A, MW-201, MW-202, MW-203A, MW-203B, and MW-204A also

exceeded the 30 µg/L GW-2 standard. The highest concentration of TCE, 13,000 µg/L, was detected in the sample collected from well MW-113A, located on the WAC property. This well was not sampled in 2003 but is only about half of the 2003 maximum TCE concentration.

TCE concentrations detected in overburden and bedrock aquifer samples are shown in plan view on Figures 3-1 and 3-2, respectively. These plumes were constructed by contouring data points with the GIS Spatial Analyst program using a nearest natural neighbor algorithm and applying small corrections based on groundwater flow directions as well as referencing the ICF 2003 TCE contour maps which had greater spatial coverage.

- **Vinyl chloride** was detected at concentrations exceeding the 2 µg/L GW-1 and GW-2 standards in the samples collected from monitoring wells MW-201, MW-202, and MW-304B; and bedrock wells MW-203A, MW-204A, and MW-304A. The highest concentration of vinyl chloride, 460 µg/L, was detected in the sample collected from bedrock monitoring well MW-203A. This represents an order of magnitude increase in concentration from 2003 at this location but is still lower than the 2003 maximum. Vinyl chloride concentrations that exceed the GW-1/GW-2 standards were generally detected in samples collected from north-central portion of the contaminant plume and in the sample collected from bedrock well MW-203A, which is located on the eastern portion of the contaminant plume, south of Pleasant Street.

### 3.1.2 SVOC Analytical Data

Groundwater samples collected from 29 monitoring wells in January 2011 were analyzed for SVOCs as shown in Table 3-2. The following SVOCs were detected at concentrations exceeding the MassDEP GW-1 and/or GW-2 standards:

- **4-chloroanaline** was detected at concentrations of 99.1 µg/L in the sample collected from monitoring well MW-203A, exceeding the 20 µg/L GW-1 standard. There are no 4-chloroanaline data reported in the 2003 sampling round. No detected concentration of 4-chloroanaline exceeds the 50,000 µg/L GW-2 standard.

- **1,2,4-Trichlorobenzene (TCB)** was detected at concentrations exceeding the 70 µg/L GW-1 standard in samples collected from overburden monitoring wells MW-113B, MW-201, MW-202, and MW-203B, bedrock monitoring wells MW-113A, MW-115A, and MW-203A, and overburden/bedrock wells RW-1 and B-5. No samples exceed the 2,000 µg/L GW-2 standard. The highest concentration of 1,2,4-TCB, 414 µg/L, was detected in the sample collected from well MW-202, located within the north-central portion of the contaminant plume. This represents a decrease in concentration compared to 2003 data at this location which was also the 2003 maximum. With the exception of the sample collected from bedrock well MW-113A, which is located in an isolated area of elevated VOC concentrations on the western portion of the contaminant plume, samples with 1,2,4-TCB exceedances were collected from wells located on the north-central portion of the contaminant plume, south of Mill Pond.
- **1,2-Dichlorobenzene (DCB)** was detected at concentrations exceeding the 600 µg/L GW-1 standard in the samples collected from overburden monitoring wells MW-113B, MW-202, and MW-203B, bedrock wells MW-113A, MW-115A, MW-203A, and MW-304A, and overburden/bedrock wells RW-1 and B-5. The 1,2-DCB concentrations detected in the samples collected from overburden well MW-113B, bedrock wells MW-113A and MW-203A, and overburden/bedrock well RW-1 also exceeded the 2,000 µg/L GW-2 standard. The highest concentration of 1,2-DCB, 26,000 µg/L, was detected in the sample collected from bedrock well MW-113A, located on the WAC property. This well was not sampled in 2003 but the concentration represents an order of magnitude increase from the 2003 maximum. 1,2-DCB concentrations that exceed the GW-1/GW-2 standards were detected in samples collected from two areas of the contaminant plume, consistent with other VOC contamination: the WAC property on the western portion of the contaminant plume and wells located on the north-central portion of the contaminant plume, south of Mill Pond.
- **1,3-DCB** was detected at concentrations exceeding the GW-1 standard of 40 µg/L in the samples collected from overburden monitoring wells MW-113B and MW-302, bedrock well MW-113A and MW-203A, and overburden/bedrock wells B-5, and RW-1. The highest concentration of 1,3-DCB, 870 µg/L, was detected in the sample collected from well bedrock well MW-113A, located on the WAC property. This well was not sampled in 2003 but the concentration represents an order of magnitude increase from the 2003

maximum. There were no exceedances of GW-2 for this compound. Samples with 1,3-DCB exceedances were generally collected from the area of contamination associated with the WAC property on the western portion of the contaminant plume.

- **1,4-DCB** was detected at concentrations exceeding the 5 µg/L GW-1 standard in the samples collected from overburden monitoring wells MassDEP-MW-1, MassDEP-MW-2, MW-06A, MW-08, RMW-102, MW-113B, MW-201, MW-202, MW-203B, MW-302, and MW-304B; bedrock wells MW-107, MW-112A, MW-113A, MW-115A, MW-203A, MW-204A, and MW-304A; and overburden/bedrock wells RW-1 and B-5. The concentrations of 1,4-DCB detected in the samples collected from wells MW-113B, MW-202, MW-107, MW-113A, MW-203A, MW-304A, RW-1, and B-5 also exceeded the GW-2 standard of 200 µg/L. The highest concentration of 1,4-DCB, 3,535 µg/L, was detected in the sample collected from well MW-113B, located on the WAC property. This well was not sampled in 2003 but the concentration represents an order of magnitude increase from the 2003 maximum. Samples with 1,4-DCB exceedances were generally collected from the area of contamination on the western portion of the contaminant plume (WAC property) and are more widely spread out on the central and eastern portions of the contaminant plume.

### 3.1.3                  Metals Analytical Data

Groundwater samples collected from 29 monitoring wells were analyzed for total TAL metals and total mercury per the EPA approved QAPP and results are tabulated in Table 3-3. Because the samples were analyzed for total metals analyses, comparison to MassDEP GW-1 standards, which are based on dissolved metals analyses, will be biased high. The following metals were detected at concentrations exceeding the MassDEP GW-1 standards:

- **Arsenic** was detected at concentrations exceeding the 10 µg/L GW-1 standard in the samples collected from monitoring wells MW-06A and MW-203B. Arsenic was detected at both locations in 2003 at concentrations exceeding GW-1.
- **Chromium** was detected at a concentration exceeding the 100 µg/L GW-1 standard in one sample collected from monitoring well MW-204A. Chromium exceeded its GW-1 standard in 2003;

- **Lead** was detected at a concentration exceeding the 15 µg/L GW-1 standard in one sample collected from monitoring well MW-403A. This well was not sampled in 2003;
- **Nickel** was detected at a concentration exceeding the 100 µg/L GW-1 standard in one sample collected from monitoring well MW-204A; and
- **Thallium** was detected at concentrations exceeding the 2 µg/L GW-1 standard in the samples collected from monitoring wells MW-304A and MW-304B. Thallium was not detected in both wells in 2003.

Mercury was detected in 11 of the 29 monitoring wells (Figure 3-3) and concentrations ranged from 0.24 µg/L (MW-204A) to 8 µg/L (P-1). The 2011 maximum concentration is less than the 2003 maximum at MW-204A. Locations with detected mercury were generally limited to the vicinity of the Nyacol and WAC properties, the MW-4 cluster and two downgradient locations (MW-202 and MW-304A). Only two metals (antimony and mercury) exceeded MCLs at two locations (P-1 and MW-08).

### 3.1.4 Anion Analytical Data and Field Parameter Measurements

Groundwater samples collected from 29 monitoring wells in January 2011 were analyzed for anions as shown in Table 3-4. These anions are often used as indicators of biodegradation. Microbes will preferentially use nitrate, ferric iron and sulfate containing compounds as electron acceptors for anaerobic degradation of hydrocarbons. Depletion of these terminal electron acceptors may be indicative of ongoing biodegradation. Anaerobic degradation generally begins when dissolved oxygen (DO) levels are less than 1 µg/L. In the overburden aquifer very low DO levels (less than 1 µg/L) were generally found east of WAC with the exception of MW-202 (7.82 µg/L) located in the core of the TCE plume and RMW-403B (3.85 µg/L) located across the Sudbury River. DO values in wells on the WAC property and farther west are between 1 µg/L and 5 µg/L with the exception of the very low DO at RMW-102 (0.68 µg/L) and the high value of 6.73 µg/L at MW-113B where the highest overburden TCE concentrations were observed. The bedrock aquifer is generally anoxic with DO concentrations less than 1 µg/L except near the outer edges of the sampling area at MW-204A (3.29 µg/L), RMW-403A (3.76 µg/L), and an anomalously high value of 5.55 µg/L at MW-115A.

Chloride accumulation is often used as an indicator of reductive dechlorination. The highest chloride and sulfate values tend to be located in the bedrock wells (MW-115A, MW-203A, and MW-304A) or in companion overburden cluster wells (MW-203B and MW-304B), and correlate well with the highest measured specific conductance values. These wells are generally in the core of the organics plume and the chloride may be derived from reductive dechlorination. There are also elevated chloride levels in bedrock and overburden wells near the core (MW-107, MW-112A) where TCE concentrations were higher in past sampling rounds. Electron acceptors such as nitrate and sulfate show a range of concentrations across the Site and do not necessarily correspond with DO data that would indicate favorable anaerobic degradation conditions. High chloride and sulfate concentrations (greater than 1,400 µg/L) were observed in three bedrock wells MW-115A, MW-203A, and MW-304A. Two of these wells, MW-203A and MW-304A are anoxic (DO values less than 1 µg/L) while MW-115A has ample DO at 5.55 µg/L. MW-115A and MW-203A exhibited order of magnitude declines in TCE concentrations (4,300 µg/L and 2,800 µg/L to 640 µg/L and 500 µg/L, respectively) while MW-304A showed an increase from 1,400 to 2,000 µg/L.

### **3.2 Data Quality Assessment and Limitations**

In accordance with the WPA and QAPP, a data quality assessment was performed to evaluate whether the groundwater data acquired during the January 2011 sampling event were suitable for use in assessing the current nature and extent of groundwater contamination. Detailed results of the Tier 1 modified data validation are provided in the memoranda presented in Appendix B.

All of the samples were analyzed and the data considered valid as reported from the laboratory. The data, with the qualifications noted during data validation, are considered usable for decision-making purposes.

### **3.3 Data Evaluation**

Organic and inorganic contaminants including VOCs (benzene, bromomethane, chlorobenzene, cis-1,2-DCE, TCE, and vinyl chloride); SVOCs (1,2,4-TCB, 1,2-DCB, 1,4-DCB, and naphthalene); and metals (arsenic, beryllium, cadmium, chromium, mercury, and nickel) have been detected historically in groundwater samples collected from the Site at concentrations

exceeding GW-1 standards. Bromomethane, chlorobenzene, TCE, and vinyl chloride have also been present historically at concentrations exceeding the GW-2 standards.

The Fall 2003 groundwater monitoring round (ICF, 2004) included a similar number of wells as sampled in January 2011, but only 17 of the 29 wells sampled by ICF were included in the January 2011 sampling. The ICF monitoring event included monitoring wells adjacent to and south of the railroad tracks, in the former vault area and around the Capped Area (see Figure 3-1). Some wells in the central portion of the Site were destroyed (along Pleasant Street) or became inaccessible in the intervening years. Therefore, the January 2011 sampling focused on the area north of the railroad tracks and south of the Sudbury River and Mill Pond, and included additional wells installed after 2003.

While the January 2011 data show a distribution of VOCs, SVOCs, and metals in the overburden and bedrock groundwater similar to that reported by ICF, TCE concentrations remained below the laboratory detection limits in samples from 3 of the 17 wells sampled in 2003 (WP-105, MW-306, and RMW-403B), increased in 3 wells (MW-113B, MW-204A, and MW-304A), and decreased in samples collected from the remaining 12 wells.

A comparison is made in Table 3-5 between the 17 wells sampled in both 2003 and 2011 of relative changes in concentrations for those organic compounds exceeding GW-2 criteria. There are wells that exceeded GW-2 concentrations for some parameters in 2003 that did not 2011 as well as the converse with GW-2 exceedances in 2011 and not in 2003. The relative difference is between the rounds is denoted with a plus sign for an increase over time and a minus sign for a decrease over time. Of the 12 locations where TCE exceeded the GW-2 criterion, 9 show a decrease in TCE concentration over time. One of the 12 locations dropped below the GW-2 criterion in 2011. Two wells showed an increase in TCE concentration.

In general, the 2011 TCE plume centerline concentrations are reduced and the outer edges contracted when compared to the 2003 plume. Overburden concentrations at the plume edge are less than their 2003 counterparts, and the only concentration increase is the hot-spot formation at MW-113B. This increase from 14 µg/L to 8,700 µg/L may be attributable to the influence of the measured 1.5 feet of DNAPL in the bedrock monitoring well counterpart MW-113A. Otherwise, order of magnitude decreases are observed along the centerline of the plume in monitoring wells MW-202, MW-203B, and MW-201. Concentrations in the western

edge well, MW-4A decreased from 100 µg/L to non-detect. There are no data available to describe any changes in the southern portions of the Site where flow comes off the Capped Area.

A similar reduction in plume size is noted for the bedrock TCE concentrations. Again order of magnitude changes are observed along the centerline (MW-203A and MW-115A) and there is reduction at the western edge well MW-4B. The two increases observed in bedrock were in MW-204A where concentrations increased from 110 µg/L to 175 µg/L and MW-304A where concentrations increased from 1,400 µg/L to 2,000 µg/L. Both wells are downgradient of the high concentration area of the MW-113 cluster. Like the overburden, there are no data available to describe changes in the southern portions of the Site descending off of the Capped Area.

Since 1994, DNAPL has been observed in bedrock well MW-113A, and has been observed on occasion in RW-1. During well sounding activities conducted between August and October 2008, measured DNAPL thicknesses in MW-113A ranged from 6 inches to 1.5 feet. Accumulation rates varied but a product thickness of 0.5 feet over a two week period was observed on several occasions. Thus, a measured DNAPL thickness of 1.5 feet in January 2011 is not unusual given the greater than one year time period when MW-113A was measured last. DNAPL was not observed in any other wells during the January 2011 monitoring event.

As a rule of thumb, DNAPL may be suspected in areas where dissolved groundwater concentrations exceed one percent (1%) of the theoretical solubility of a particular compound. The solubility of TCE at 10°C is 1,566,000 µg/L in water (Pankow and Cherry, 1996). Therefore, concentrations of TCE exceeding a 1% value of 15,660 µg/L might be indicative of DNAPL nearby. Although Nobis personnel measured 1.5 feet of DNAPL in well MW-113A during the January 2011 monitoring event, TCE was not detected at concentrations exceeding 15,660 µg/L in the groundwater samples collected in January.

With regard to the solubility of other contaminants (besides TCE) and the potential presence of a DNAPL source, the following were also detected above their 1% solubility (given in the parentheses): 1,2-DCB (763 µg/L at 10°C); 1,4-DCB (790 µg/L at 10°C); chlorobenzene (2,939 µg/L at 10°C), [Pankow and Cherry, 1996]; and nitrobenzenene (20,900 µg/L at 25°C), [USEPA, 2010]. Based on observed concentrations above these levels from RW-1, B-5/MW,

and MW-113B suggests the presence of DNAPL in the vicinity of the WAC property. Additionally, 1,2-DCB concentrations detected in wells overburden wells MW-202 and MW-203B, and bedrock wells MW-203A and MW-304A which exceed or approach the 1,2-DCB 1% solubility value of 763 µg/L. This indicates that DNAPL may also be present in the north-central portion of the Site where contaminant concentrations exceed the MassDEP GW-2 standards (Figure 3-5) and are within the western portion of the GW-2 plume that is part of the eastern portion of the contaminant plume depicted on Figure 3-5.

The contaminant plumes of compounds detected above the GW-1 and GW-2 standards cover similar areas for both sampling events (see Figures 3-4 and 3-5). The extent of the GW-1 and GW-2 are depicted as extent of exceedances only at the specified well locations and does not represent contaminant concentration contours. Figures 3-4 and 3-5 show that the approximate GW-1 exceedance plumes extends further west than in the ICF 2004 report due to the presence of VOCs and SVOCS at concentrations above GW-1 standards in the sample collected from RMW-102, which was not sampled as part of the ICF investigation. The GW-1 and GW-2 contaminant plumes depicted in the ICFs 2004 report extended further north and east than the plume in Figures 3-4 and 3-5 based on the presence of metals, SVOCS, and VOCs above the GW-1 standards in samples collected from wells MW-405A and MW-405B in Fall 2003. Wells MW-405A and MW-405B were not sampled as part of the January 2011 monitoring program; however, no analytes were detected above the GW-1 standards in the samples collected from wells RMW-403A and RMW-403B, located northeast of wells MW-405A and MW-405B, across the Sudbury River. Based on this information, it is not likely that the GW-1 contaminant plume extends farther northeast than depicted in the ICF 2003 report.

As shown on Figures 3-4 and 3-5, there is still a large area of the Site where organic compounds exceed the GW-1 standards with smaller subareas exceeding the GW-2 standards. Based on historical analytical data, it is likely that GW-1 and GW-2 exceedances would be detected in samples collected from wells located south of the railroad tracks, in the vicinity of the former vault area and sludge drying beds.

Using the groundwater analytical data, a 30 µg/L TCE isopleth was developed to infer the GW-2 concentration limit in the overburden aquifer and is depicted on Figure 3-6. The TCE isopleth was compared to the locations of the existing vapor mitigation systems (VMS) to determine if any VMS are located outside of this TCE GW-2 boundary. Based on the comparison, there are

several VMS located in areas where inferred TCE groundwater concentration is below 30 µg/L. These VMS are #10, #12, and #34 through #42.

## **4.0 CONCLUSIONS AND RECOMMENDATIONS**

### **4.1 Conclusions**

Based on the results of the January 2011 sampling round and evaluation of limited historical data, Nobis concludes the following:

- Groundwater was encountered at depths ranging from 1.45 ft bgs (MW-06A) to 13.41 ft bgs (MW-201). These water level depths are within the 15-ft depth criteria for GW-2 screening. Also, GW-2 standards apply for groundwater that is considered a potential source for indoor air contamination. The criteria for GW-2 applicability are to be within 30 feet of an occupied building or structure and the average annual depth to the water table is 15 feet or less.
- Overburden groundwater flows in a general north-northeasterly direction on the western portion of the Site, toward Mill Pond, and in a west-northwesterly direction on the eastern portion of the Site, toward the Sudbury River. This is consistent with historical trends.
- Bedrock groundwater also flows toward Mill Pond and the Sudbury River. This data is consistent with previous interpretations, which have indicated that groundwater in the vicinity of the Site is discharging to the Sudbury River in the areas downstream of Mill Pond, while surface water is infiltrating groundwater both upstream of and in the area of Mill Pond.
- Contaminants in overburden and bedrock groundwater samples detected at concentrations exceeding the GW-1 standards include: benzene, 1,2,4-TCB, 1,2-DCB, 1,3-DCB, 1,4-DCB, chlorobenzene, cis-1,2-DCE, TCE, and vinyl chloride, and 4-chloroaniline.
- Several metals, including arsenic, chromium, lead, nickel, and thallium, exceeded the GW-1 standard. All other detected metals, including mercury, were at concentrations below GW-1. Organic chemicals in overburden and bedrock groundwater samples

detected at concentrations exceeding the GW-2 standards include: 1,2-DCB, cis-1,2-DCE, TCE, vinyl chloride, 1,2,4-TCB, and 1,4-DCB.

- The overall pattern of groundwater contamination in the overburden and bedrock groundwater aquifers in January 2011 is consistent with historical data and calculated groundwater flow directions. There appears to be TCE plume contraction when compared to the 2003 data, however, there were additional data in 2003 along the southern boundary of the Site. A major difference is the increase in TCE concentrations in overburden monitoring well MW-113B from 14 µg/L to 8,700 µg/L. This increase from 14 µg/L to 8,700 µg/L may be attributable to the influence of the measured 1.5 feet of DNAPL in the bedrock monitoring well counterpart MW-113A. Re-sampling of MW-113B is recommended.
- DNAPL was measured in groundwater monitoring well MW-113A at a thickness of 1.5 feet. There was no measurable accumulation in other wells that previously exhibited DNAPL (RW-1 and B-5). A comparison of measured organic concentrations to 1% of the chemical's solubility suggests the presence of DNAPL in the vicinity of the WAC property. Additionally, 1,2-DCB concentrations detected in wells overburden wells MW-202 and MW-203B, and bedrock wells MW-203A and MW-304A exceed or approach the 1,2-DCB 1% solubility value.

## **4.2 Recommendations**

- Collect groundwater samples from selected monitoring wells located on the WAC property within the increased overburden TCE plume at MW-113B to verify the plume magnitude.
- Pump recoverable DNAPL in MW-113A with an extraction system that would be capable of periodic extraction as necessary. This system would most likely be smaller than the originally proposed belt skimmer or pneumatic system.
- Continue to monitor for potential accumulation of DNAPL in wells RW-1 and B-5 at a set schedule (e.g., quarterly).

- Perform additional groundwater monitoring to determine if the apparent plume contraction is part of a broader trend.
- Continue operation of the VMS at locations that are within the TCE GW-2 extent. For existing VMS locations outside the TCE GW-2 extent, recommend collection of site-specific groundwater samples for TCE analysis to confirm if TCE concentrations are below GW-2, which may warrant disinvestment from maintenance and monitoring of certain VMS. The groundwater sample collection could be achieved through the installation of temporary piezometers.

## **5.0 REFERENCES**

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**Table 2-1**  
**January 2011 Groundwater Gauging and Sampling Information**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**

Well Number	Well Type	Depth to Groundwater (ft bgs)	Total Depth (ft bgs)	Surface Elevation (ft MSL)	PVC Elevation (ft MSL)	Groundwater Elevation (ft MSL)	DNAPL thickness (ft)	Sample ID	Date Sampled	Sample Time	QC
P-1	OB	3.98	20.16	196.84	196.46	192.48		EP0126	1/11/2011	14:55	
RW-1	OB/BR	4.86	53.99	196.69	196.38	191.52		EP0117	1/11/2011	10:50	
B-5	OB/BR	3.28	32.29	NS	NS	NS		EP0115	1/11/2011	11:40	
MW-04A	OB	6.61	20.68	199.60	199.65	193.04		EP0144	1/18/2011	12:00	MS/MSD (2)
MW-04B	OB/BR	6.65	65.87	199.50	199.54	192.89		EP0145	1/18/2011	12:20	
MW-06A	OB	1.45	69.23	193.99	194.33	192.88		EP0150	1/19/2011	10:50	
MW-08	OB	5.11	46.45	197.90	198.54	193.43		EP0149	1/19/2011	11:20	
RMW-102	OB	4.46	12.12	192.90	194.42	189.96		EP0138	1/17/2011	11:50	
MW-103	OB	8.54	19.00	198.30	201.14	192.60		EP0132	1/14/2011	10:50	
WP-105	OB	6.90	12.69	192.00	NA	NA		EP0161	1/21/2011	11:10	
MW-107	BR	5.97	38.34	192.00	194.42	188.45		EP0146/EP0147	1/18/2011	12:25	DUP02
MW-112A	BR	6.68	47.41	195.80	198.28	191.60		EP0156	1/20/2011	11:10	
MW-113A	BR	3.26	53.81	195.99	195.69	192.43	1.5	EP0124	1/11/2011	14:40	
MW-113B	OB	3.49	46.24	195.54	195.33	191.84		EP0125	1/11/2011	15:20	
MW-115A	BR	7.96	45.88	192.76	192.62	184.66		EP0128	1/13/2011	13:30	
MW-201	OB	13.41	22.67	197.70	200.21	186.80		EP0201	1/10/2011	13:35	MS/MSD (1)
MW-202	OB	10.57	28.08	196.00	198.60	188.03		EP0112/EP0113	1/10/2011	12:55	
MW-203A	BR	5.54	78.49	194.40	194.72	189.18		EP0111	1/10/2011	13:50	DUP01
MW-203B	OB	5.57	31.91	194.40	194.37	188.80		EP0116	1/11/2011	10:45	
MW-204A	BR	8.41	48.03	199.08	198.60	190.19		EP0133	1/14/2011	10:30	
MW-302	OB	10.55	24.26	193.16	192.96	182.41		EP0134	1/14/2011	10:50	
MW-304A	BR	3.87	53.04	193.17	192.97	189.10		EP0136	1/17/2011	11:55	
MW-304B	OB	4.69	29.89	193.34	193.10	188.41		EP0137	1/17/2011	11:40	
MW-305B	OB	7.21	19.10	197.08	196.87	189.66		EP0160	1/21/2011	10:50	
MW-306	OB	8.17	28.84	201.66	201.32	193.15		EP0159	1/21/2011	11:00	
RMW-403A	BR	7.51	47.28	185.10	187.47	179.96		EP0157	1/20/2011	12:00	
RMW-403B	OB	8.01	21.83	185.40	187.64	179.63		EP0153	1/19/2011	11:05	
MW-406A	BR	8.46	42.41	187.10	186.72	178.26		EP0129	1/13/2011	12:00	
MW-406B	OB	8.61	62.94	187.18	186.86	178.25		EP0130	1/13/2011	12:10	
MADEP-MW-1	OB	NM	15.00	NS	NS	NS		EP0154	1/20/2011	10:30	
MADEP-MW-2	OB	NM	20.00	NS	NS	NS		EP0155	1/20/2011	11:25	

**Notes:**

1. MS/MSD = Matrix spike/matrix spike duplicate  
 2. DUP = Duplicate sample

3. NM = Not measured  
 4. NS = Not surveyed

5. ft = feet  
 6. bgs = below ground surface

7. MSL = Mean Sea Level  
 8. NA = Not applicable

**Table 2-2**  
**January 2011 Groundwater Monitoring Well Construction Details**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**

Well Number	Well Type	Northing	Easting	Depth to Water* (ft bgs)	Construction Depth (ft bgs)	Measured Depth (ft bgs)	Depth to Bedrock (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	Suggested Pump Intake (ft bgs)	Well Diameter (inches)	Well Constr. Material	Surface Completion
P-1	OB	459457.9875	606892.4921	3.98	42.0	20.16	Unk	39.0	42.0	3.0	40.5	2	PVC	SP
RW-1	OB/BR	459475.3429	606877.7775	4.86	55.0	53.99	40.0	36.0	51.0	15.0	43.5	6	PVC	FM
B-5	OB/BR	NS	NS	3.28	47.0	32.09	42.0	39.0	46.0	7.0	42.5	2	SS	FM
MW-4A	OB	459530.9893	606323.2521	6.61	24.0	20.68	--	4.0	24.0	20.0	14.0	2	PVC	SP
MW-4B	OB/BR	459532.4289	606300.3524	6.65	68.0	65.87	Unk	48.0	68.0	20.0	58.0	2	PVC	SP
MW6A	OB	459382.3149	607659.1866	1.45	12.0	69.23	--	7.0	12.0	5.0	9.5	2	PVC	FM
MW-08	OB	NS	NS	5.11	Unk	46.45	--	Unk	Unk	Unk	Unk	2	PVC	SP
RMW-102	OB	NS	NS	4.46	10.0	12.12	--	5.0	10.0	5.0	7.5	2	PVC	SP
MW-103	OB	458750.0178	607920.8791	8.54	15.0	19.00	--	10.0	15.0	5.0	12.5	2	PVC	SP
WP-105	OB	460066.8209	608213.6620	6.90	11.0	12.69	--	9.0	11.0	2.0	10.0	2	PVC	Unk
MW-107	BR	459300.9921	608243.5811	5.97	35.9	38.34	26.6	30.9	35.9	5.0	33.4	2	PVC	SP
MW-112A	BR	459411.5484	607190.5248	6.68	43.0	47.41	35.0	38.0	43.0	5.0	40.5	2	SS	SP
MW-113A	BR	459479.5293	606836.6590	3.26	51.0	53.81	43.0	46.0	51.0	5.0	48.5	2	SS	FM
MW-113B	OB	459490.5851	606839.7613	3.49	29.5	46.24	--	24.5	29.5	5.0	27.0	2	SS	FM
MW-115A	BR	459688.8481	608695.2621	7.96	91.0	45.88	70.0	86.0	91.0	5.0	88.5	2	PVC	FM
MW-201	OB	459755.6006	608242.9346	13.41	20.0	22.67	--	15.0	20.0	5.0	17.5	2	PVC	SP
MW-202	OB	459774.9684	607995.7403	10.57	25.0	28.08	--	20.0	25.0	5.0	22.5	2	PVC	SP
MW-203A	BR	459636.1056	607895.9888	5.54	78.7	78.49	68.0	73.7	78.7	5.0	76.2	2	SS	SP
MW-203B	OB	459640.9212	607896.8360	5.57	32.0	31.91	--	27.0	32.0	5.0	29.5	2	PVC	SP
MW-204A	BR	459732.5759	606792.0587	8.41	52.6	48.03	36.5	47.6	52.6	5.0	50.1	2	SS	FM
MW-302	OB	459450.8997	608880.7531	10.55	25.0	24.26	--	20.0	25.0	5.0	22.5	2	PVC	FM
MW-304A	BR	459983.2487	607520.8614	3.87	55.0	53.04	45.0	50.0	55.0	5.0	52.5	2	PVC	FM
MW-304B	OB	459983.9671	607526.8326	4.69	30.7	29.89	--	25.7	30.7	5.0	28.2	2	PVC	FM
MW-305B	OB	459964.7348	607138.0529	7.21	19.5	19.10	--	14.5	19.5	5.0	17.0	2	PVC	FM
MW-306	OB	459643.5923	605257.2506	8.17	30.0	28.84	--	25.0	30.0	5.0	27.5	2	PVC	SP
RMW-403A	BR	460151.4101	609362.0027	7.51	44.9	47.28	37.0	41.0	44.9	3.9	43.0	2	PVC	SP
RMW-403B	OB	460128.0769	609401.7741	8.01	19.5	21.83	--	14.5	19.5	5.0	17.0	2	PVC	SP
MW-406A	BR	459153.2682	609843.8629	8.46	66.0	42.41	45.9	61.0	66.0	5.0	63.5	2	PVC	SP
MW-406B	OB	459153.7853	609832.2301	8.61	43.0	62.94	--	38.0	43.0	5.0	40.5	2	PVC	FM
MADEP-MW-1	OB	NS	NS	NM	15.0	15.00	Unk	10.0	15.0	5.0	12.5	1	PVC	FM
MADEP-MW-2	OB	NS	NS	NM	20.0	20.00	Unk	15.0	20.0	5.0	17.5	1	PVC	FM

**Notes:**

\* Depth to water measured January 10 - 20, 2011

1. OB - Overburden

3. SS - Stainless Steel

2. BR - Bedrock

4. FM = flush-mount

5. SP = stand pipe

6. ft bgs = feet below ground surface

7. -- = bedrock was not encountered

8. PVC = polyvinyl chloride

9. Unk = unknown

10. NM = Not measured

NS - Not Surveyed

Nobis Engineering, Inc.

**Table 2-3**  
**January 2011 Groundwater Field Parameter Measurements**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**

Well Number	Temperature (°C)	Spec. Cond. (µS/cm)	pH	ORP (mV)	DO (mg/L)	Turbidity (NTU)
P-1	10.71	330	5.84	207.8	1.64	12.0
RW-1	10.25	871	5.31	149.5	0.44	202.0
B-5	9.81	784	5.73	117.2	4.90	11.8
MW-04A	9.34	65	6.00	151.1	2.31	24.8
MW-04B	9.38	673	5.99	216.9	4.62	28.5
MW-06A	9.87	401	6.15	-77.0	0.92	50.9
MW-08	6.69	1,412	6.14	16.8	1.89	4.3
RMW-102	5.43	379	6.00	200.4	0.68	8.8
MW-103	8.48	90	5.54	150.8	0.89	21.1
WP-105	6.07	570	6.29	114.8	0.39	1.7
MW-107	8.37	1,627	5.82	92.6	0.83	4.3
MW-112A	8.47	1,343	6.98	-42.6	0.45	24.1
MW-113A	8.86	371	5.97	190.9	0.86	12.0
MW-113B	9.71	671	6.19	63.7	6.73	18.0
MW-115A	10.30	3,808	3.02	515.1	5.55	3.0
MW-201	13.56	2,377	5.73	66.7	0.33	27.9
MW-202	10.88	2,458	5.47	162.8	7.82	53.0
MW-203A	10.38	13,779	7.41	-297.0	0.23	7.6
MW-203B	6.37	1,546	6.28	-15.5	0.80	81.7
MW-204A	7.86	268	5.20	215.2	3.29	42.9
MW-302	10.59	392	4.39	287.2	0.61	23.1
MW-304A	8.57	7,659	6.37	-55.8	0.41	1.3
MW-304B	9.66	3,109	6.30	140.9	0.42	2.8
MW-305B	10.28	254	4.67	257.6	1.17	27.5
MW-306	8.88	288	6.72	-1.8	3.40	11.0
RMW-403A	9.58	628	5.42	198.2	3.76	162.0
RMW-403B	9.69	760	6.07	55.1	3.85	136.0
MW-406A	11.69	854	7.31	-56.2	0.54	7.5
MW-406B	11.31	722	6.18	184.2	0.97	8.3
MADEP-MW-1	NM	NM	NM	NM	NM	NM
MADEP-MW-2	NM	NM	NM	NM	NM	NM

**Notes:**

1. ORP = oxidation reduction potential
2. mV = millivolt
3. µS/cm = microSiemens per centimeter
4. mg/L = milligrams per liter
5. NTU = Nephelometric Turbidity Units
6. NM = Not measured

**Table 3-1**  
**January 2011 Groundwater Analytical Results - VOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
**Page 1 of 4**

Sample Location		P-1 P-01- 011111A	RW-1 RW-01- 011110A	B-5 B-05- 011110A	MW-4A MW-403A- 011811A	MW-4B MW-403B- 011811A	MW-06A MW-06A- 011911A	MW-08 MW-08- 011911A	RMW-102 RMW-102- 011711A	MW-103 MW-103- 011411A	WP-105 WP-105- 012111A	MW-107 DUP-02- 011811A	MW-107 MW-107- 011811A	MW-112A MW-112A- 012011A	MW-113A MW-113A- 011111A	MW-113B MW-113B- 011111A	MW-115A MW-115A- 011310A	
Sample ID		1/11/2011 2:55:00 PM	1/11/2011 10:50:00 AM	1/11/2011 11:40:00 AM	1/18/2011 12:00:00 PM	1/18/2011 12:20:00 PM	1/19/2011 10:50:00 AM	1/19/2011 12:20:00 PM	1/17/2011 11:50:00 AM	1/14/2011 10:50:00 AM	1/21/2011 11:10:00 AM	1/18/2011 12:20:00 PM	1/18/2011 12:25:00 PM	1/20/2011 11:10:00 AM	1/11/2011 2:40:00 PM	1/11/2011 3:20:00 PM	1/13/2011 1:30:00 PM	
Chemical Name	GW-1 Standard	GW-2 Standard																
1,1,1,2-Tetrachloroethane	5	10	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,1,1-Trichloroethane	200	4000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,1,2,2-Tetrachloroethane	2	9	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,1,2-Trichloro-1,2,2-Trifluoroethane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,1,2-Trichloroethane	5	900	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,1-Dichloroethane	70	1000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,1-Dichloroethene	7	80	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,1-Dichloropropene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,2,3-Trichlorobenzene			1 U	10 U	10 U	1 U	1 U	8.2	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,2,3-Trichloropropane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,2,4-Trichlorobenzene	70	2000	1 U	75.2	65.3	1 U	1 U	41	1 U	1 U	1 U	25	25	1.1	280	500 U	35	
1,2,4-Trimethylbenzene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,2-Dibromo-3-Chloropropane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,2-Dibromoethane	0.02	2	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,2-Dichlorobenzene	600	2000	1 U	1300	1100	1 U	1 U	20	4.7	1 U	1 U	530	530	17	26000	22000	160	
1,2-Dichloroethane	5	5	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,2-Dichloropropane	3	3	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,3,5-Trimethylbenzene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,3-Dichlorobenzene	40	2000	1 U	60.7	48.4	1 U	1 U	1 U	1.5	1 U	1 U	10 U	10 U	1 U	870	720	10 U	
1,3-Dichloropropane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
1,4-Dichlorobenzene	5	200	1 U	318.9	253	1 U	1 U	3.5	1.9	1 U	1 U	74	75	3	5800	4800	27	
1,4-Dioxane	3	6000	2 U	2 U	20 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	10 U	2 U	400 U	400 U	10 U	
2,2-Dichloropropane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
2-Butanone	4000	50000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
2-Chlorotoluene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
2-Hexanone			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
2-Methyl-2-Phenylpropane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
2-Phenylbutane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
4-Chlorotoluene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
4-Methyl-2-Pentanone	350	50000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Acetone	6300	50000	1 U	10 U	10 U	1.2	1 U	1 U	1 U	1 U	1 U	1	11	10 U	1 U	200 U	500 U	10
Acrylonitrile			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Benzene	5	2000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Bromobenzene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Bromoform			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Bromomethane	7	7	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Carbon Disulfide			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Carbon Tetrachloride	2	2	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U	
Chlorobenzene	100	200</td																

**Table 3-1**  
**January 2011 Groundwater Analytical Results - VOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
**Page 2 of 4**

Sample Location			P-1 P-01- 011111A	RW-1 RW-01- 011110A	B-5 B-05- 011110A	MW-4A MW-403A- 011811A	MW-4B MW-403B- 011811A	MW-06A MW-06A- 011911A	MW-08 MW-08- 011911A	RMW-102 RMW-102- 011711A	MW-103 MW-103- 011411A	WP-105 WP-105- 012111A	MW-107 DUP-02- 011811A	MW-107 MW-107- 011811A	MW-112A MW-112A- 012011A	MW-113A MW-113A- 011111A	MW-113B MW-113B- 011111A	MW-115A MW-115A- 011310A
Sample ID			1/11/2011 2:55:00 PM	1/11/2011 10:50:00 AM	1/11/2011 11:40:00 AM	1/18/2011 12:00:00 PM	1/18/2011 12:20:00 PM	1/19/2011 10:50:00 AM	1/19/2011 12:20:00 PM	1/17/2011 11:50:00 AM	1/14/2011 10:50:00 AM	1/21/2011 11:10:00 AM	1/18/2011 12:20:00 PM	1/18/2011 12:25:00 PM	1/20/2011 11:10:00 AM	1/11/2011 2:40:00 PM	1/11/2011 3:20:00 PM	1/13/2011 1:30:00 PM
Chemical Name	GW-1 Standard	GW-2 Standard																
Cis-1,3-Dichloropropene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	200 U	500 U	10 U	
Cymene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Dibromochloromethane	2	20	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Dibromomethane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Dichlorodifluoromethane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Diethyl Ether			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Ethylbenzene	700	20000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Hexachlorobutadiene	0.6	1	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Isopropylbenzene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
M,P-Xylene			2 U	20 U	20 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U	20 U	2 U	400 U	1000 U	20 U
Methyl Tert-Butyl Ether	70	50000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Methylene Chloride	5	10000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Naphthalene	140	1000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	13
N-Butylbenzene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
N-Propylbenzene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
O-Xylene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Styrene	100	100	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Tetrachloroethene	5	50	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Tetrahydrofuran			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Toluene		1000	50000	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Trans-1,2-Dichloroethene	90	90	1 U	10 U	10 U	1 U	1 U	2.2	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Trans-1,3-Dichloropropene			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Trichloroethene	5	30	2.4	<b>1500</b>	<b>1000</b>	1 U	<b>16</b>	<b>10</b>	<b>5.1</b>	1 U	1 U	1 U	34	<b>37</b>	<b>19</b>	<b>13000</b>	<b>8700</b>	<b>640</b>
Trichlorofluoromethane			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Vinyl Acetate			1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U
Vinyl Chloride	2	2	1 U	10 U	10 U	1 U	1 U	1.3	1 U	1 U	1 U	1 U	10 U	10 U	1 U	200 U	500 U	10 U

**Notes:**

1. VOC = volatile organic compound
2. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
3. MCP = Massachusetts Contingency Plan (February 2008)
4. **Bold** text indicates concentrations that exceed the MCP Method 1 GW-1 standard
5. *Italic* text indicates concentrations that exceed the MCP Method 1 GW-2 standard
6. "U"= below detection limit

**Table 3-1**  
**January 2011 Groundwater Analytical Results - VOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
**Page 3 of 4**

Sample Location			MW-201	MW-202	MW-202	MW-203A	MW-203B	MW-204A	MW-302	MW-304A	MW-304B	MW-305B	MW-306	MW-406A	MW-406B	MW-406B	RMW-403A	RMW-403B	MADEP-MW-1	MADEP-MW-2
Sample ID			MW-201-011011A	DUP-01-011011A	MW-202-011011A	MW-203A-011011A	MW-203B-011110A	MW-204A-011411A	MW-302-011411A	MW-304A-011711A	MW-304B-011711A	MW-305B-012111A	MW-306-012111A	MW-406A-011311A	MW-406B-011311A	MW-406B-012011A	RMW-403A-012011A	RMW-403B-011911A	MADEP-MW-1-012011A	MADEP-MW-2-012011A
Sample Date & Time			1/10/2011 1:35:00 PM	1/10/2011 1:30:00 PM	1/10/2011 12:55:00 PM	1/10/2011 1:50:00 PM	1/11/2011 10:45:00 AM	1/14/2011 10:30:00 AM	1/14/2011 10:50:00 AM	1/17/2011 11:55:00 AM	1/17/2011 11:40:00 AM	1/17/2011 10:50:00 AM	1/21/2011 11:00:00 AM	1/21/2011 11:00:00 AM	1/13/2011 12:00:00 PM	1/13/2011 12:10:00 PM	1/20/2011 10:45:00 AM	1/19/2011 11:05:00 AM	1/20/2011 11:25:00 AM	1/20/2011 10:30:00 AM
Chemical Name	GW-1 Standard	GW-2 Standard																		
1,1,1,2-Tetrachloroethane	5	10	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,1,1-Trichloroethane	200	4000	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,1,2,2-Tetrachloroethane	2	9	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,1,2-Trichloro-1,2,2-Trifluoroethane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,1,2-Trichloroethane	5	900	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,1-Dichloroethane	70	1000	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,1-Dichloroethene	7	80	1 U	1 U	1 U	3.5	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,1-Dichloropropene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,2,3-Trichlorobenzene			42	76.1	67.3	9.2	49	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	5.8	4	
1,2,3-Trichloropropane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,2,4-Trichlorobenzene	70	2000	<b>120</b>	<b>230</b>	<b>220</b>	69.2	<b>210</b>	11.8	20 U	50 U	20	1 U	1 U	1 U	1 U	1 U	1 U	24	14	
1,2,4-Trimethylbenzene			1 U	1.8	1.8	8.6	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,2-Dibromo-3-Chloropropane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,2-Dibromoethane	0.02	2	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,2-Dichlorobenzene	600	2000	400	<b>710</b>	<b>720</b>	<b>1500</b>	<b>700</b>	128	577.2	<b>1100</b>	230	1 U	1 U	1 U	1 U	1 U	1 U	71	33	
1,2-Dichloroethane	5	5	1 U	1 U	1 U	1.7	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,2-Dichloropropane	3	3	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,3,5-Trimethylbenzene			1 U	1 U	1 U	2.5	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,3-Dichlorobenzene	40	2000	11	15.5	15.6	31.4	15	10 U	<b>84</b>	50 U	5	1 U	1 U	1 U	1 U	1 U	1 U	2.2	1	
1,3-Dichloropropane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
1,4-Dichlorobenzene	5	200	<b>93</b>	<b>120</b>	<b>120</b>	<b>280</b>	<b>130</b>	<b>28.8</b>	<b>80.2</b>	<b>220</b>	<b>40</b>	1 U	1 U	1 U	1 U	1 U	1 U	<b>16</b>	<b>7.5</b>	
1,4-Dioxane	3	6000	2 U	2 U	2 U	2 U	20 U	4 U	10 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	
2,2-Dichloropropane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
2-Butanone	4000	50000	1 U	1 U	1 U	1.4	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
2-Chlorotoluene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
2-Hexanone			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
2-Methyl-2-Phenylpropane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
2-Phenylbutane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
4-Chlorotoluene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
4-Methyl-2-Pentanone	350	50000	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Acetone	6300	50000	1 U	1.1	1.4	3.9	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1.2	1 U	1 U	
Acrylonitrile			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Benzene	5	2000	<b>10</b>	<b>15.8</b>	<b>15.7</b>	<b>67.6</b>	<b>16</b>	10 U	<b>50.1</b>	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1		

**Table 3-1**  
**January 2011 Groundwater Analytical Results - VOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Sample Location			MW-201	MW-202	MW-202	MW-203A	MW-203B	MW-204A	MW-302	MW-304A	MW-304B	MW-305B	MW-306	MW-406A	MW-406B	RMW-403A	RMW-403B	MADEP-MW-1	MADEP-MW-2
Sample ID			MW-201-011011A	DUP-01-011011A	MW-202-011011A	MW-203A-011011A	MW-203B-011110A	MW-204A-011411A	MW-302-011411A	MW-304A-011711A	MW-304B-011711A	MW-305B-012111A	MW-306-012111A	MW-406A-011311A	MW-406B-011311A	RMW-403A-012011A	RMW-403B-011911A	MADEP-MW-1-012011A	MADEP-MW-2-012011A
Sample Date & Time			1/10/2011 1:35:00 PM	1/10/2011 1:30:00 PM	1/10/2011 12:55:00 PM	1/10/2011 1:50:00 PM	1/11/2011 10:45:00 AM	1/14/2011 10:30:00 AM	1/14/2011 10:50:00 AM	1/17/2011 11:55:00 AM	1/17/2011 11:40:00 AM	1/21/2011 10:50:00 AM	1/21/2011 11:00:00 AM	1/13/2011 12:00:00 PM	1/13/2011 12:10:00 PM	1/20/2011 10:45:00 AM	1/19/2011 11:05:00 AM	1/20/2011 11:25:00 AM	1/20/2011 10:30:00 AM
Chemical Name	GW-1 Standard	GW-2 Standard																	
Cis-1,3-Dichloropropene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Cymene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Dibromochloromethane	2	20	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Dibromomethane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Dichlorodifluoromethane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Diethyl Ether			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Ethylbenzene	700	20000	1.1	2	2	1	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Hexachlorobutadiene	0.6	1	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Isopropylbenzene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
M,P-Xylene			2 U	2 U	2 U	3.2	20 U	20 U	40 U	100 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	
Methyl Tert-Butyl Ether	70	50000	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Methylene Chloride	5	10000	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Naphthalene	140	1000	1 U	1 U	1.3	17.1	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
N-Butylbenzene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
N-Propylbenzene			1 U	1 U	1 U	1.6	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
O-Xylene			1 U	1 U	1 U	3.9	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Styrene	100	100	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Tetrachloroethene	5	50	1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Tetrahydrofuran			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Toluene		1000	50000	1 U	1 U	1 U	18.1	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	90	90	1 U	1	1.1	37.2	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Trans-1,3-Dichloropropene			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Trichloroethene	5	30	<b>240</b>	<b>380</b>	<b>390</b>	<b>500</b>	<b>560</b>	<b>174.8</b>	<b>335.4</b>	<b>2000</b>	<b>120</b>	1	1 U	1 U	1 U	1 U	<b>88</b>	<b>35</b>	
Trichlorofluoromethane			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Vinyl Acetate			1 U	1 U	1 U	1 U	10 U	10 U	20 U	50 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
Vinyl Chloride	2	2	<b>2.3</b>	<b>2.4</b>	<b>3.5</b>	<b>460</b>	10 U	<b>15.2</b>	20 U	<b>65</b>	<b>5.8</b>	1 U	1 U	1 U	1 U	1 U	1 U	1 U	

**Notes:**

1. VOC = volatile organic compound
2. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
3. MCP = Massachusetts Contingency Plan (February 2008)
4. **Bold** text indicates concentrations that exceed the MCP Method 1 GW-1 standard
5. *Italic* text indicates concentrations that exceed the MCP Method 1 GW-2 standard
6. "U"= below detection limit

**Table 3-2**  
**January 2011 Groundwater Analytical Results - SVOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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**Table 3-2**  
**January 2011 Groundwater Analytical Results - SVOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
**Page 2 of 4**

## Notes

1. VOC = volatile organic compound
  2. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
  3. MCP = Massachusetts Contingency Plan (February 2008)

4. Bold text indicates concentrations that exceed the MCP Method 1 GW-1 standard.

5. *Italic* text indicates concentrations that exceed the MCP Method 1 GW-2 standard

6. U= below detection limit

**Table 3-2**  
**January 2011 Groundwater Analytical Results - SVOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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**Table 3-2**  
**January 2011 Groundwater Analytical Results - SVOCs**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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### **Notes:**

1. VOC = volatile organic compound
  2. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
  3. MCP = Massachusetts Contingency Plan (February 2008)

4. Bold text indicates concentrations that exceed the MCP Method 1 GW-1 standard

5. *Italic* text indicates concentrations that exceed the MCP Method 1 GW-2 standard

### 6. U= below detection limit

**Table 3-3**  
**January 2011 Groundwater Analytical Results - Total Metals Analysis**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Sample Location:		P-1	RW-1	B-5	MW-4A	MW-4B	MW-06A	MW-08	RMW-102	
Sample ID:		P-01-011111A	RW-01-011110A	B-05-011110A	MW-403A-011811A	MW-403B-011811A	MW-06A-011911A	MW-08-011911A	RMW-102-011711A	
Sample Date & Time:		1/11/2011 2:55:00 PM	1/11/2011 10:50:00 AM	1/11/2011 11:40:00 AM	1/18/2011 12:00:00 PM	1/18/2011 12:20:00 PM	1/19/2011 10:50:00 AM	1/19/2011 11:50:00 AM	1/17/2011 20 U	
Chemical Name	GW-1	MCL								
Aluminum			990	11000	440 U	2400	1700	5700	520	670
ANTIMONY	6	6	35	20 U	20 U	20 U	20 U	42	20 U	
ARSENIC	10	10	20 U	20 U						
Barium	2000	2000	94	82	29	25	49	110	110	20 U
Beryllium	4	4	8 U	8 U	8 U	8 U	8 U	8 U	8 U	
Cadmium	5	5	10 U	10 U						
Calcium			24000	50000	53000	5400	52000	26000	100000	7400
CHROMIUM	100	100	20 U	68	20 U	20 U				
Cobalt			20 U	35	33	20 U	20 U	20 U	20 U	20 U
Copper		1300	97	42	20 U	20 U	20 U	21	39	20 U
Iron			790	24000	10000	3400	4100	91000	1800	1000
LEAD	15	15	20 U	20 U	20 U					
Magnesium			2100	8200	4500	1500	12000	4000	4100	1300
Manganese			80 U	2200	1600	50	450	360	240	490
MERCURY	2	2	8	1.1	0.64	0.91	0.86	0.5 U	6.5	0.2 U
NICKEL	100		20 U	22	20 U	20 U	20 U	20 U	20 U	20 U
Potassium			3500	8200	5600	1500	3000	6400	10000	2000
Selenium	50	50	40 U	40 U	40 U	20 U	20 U	20 U	20 U	20 U
Silver	100		10 U	10 U	10 U					
Sodium			59000	94000	110000	4600	52000	51000	190000	57000
THALLIUM	2	2	40 U	40 U	20 U					
Vandium	30		20 U	22	20 U	20 U	20 U	24	20 U	20 U
Zinc	5000		39	59	63	20 U	26	36	100	20 U

**Notes:**

1. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
2. U = below detection limit
3. GW-1 = MCP Category GW-1 Standards (310 CMR 40.0974(2)
4. MCL = Maximum Containment Level: EPA's National Primary Drinking Water Regulations, updated May 2009.

**Table 3-3**  
**January 2011 Groundwater Analytical Results - Total Metals Analysis**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Sample Location:			MW-103	WP-105	MW-107	MW-107	MW-112A	MW-113A	MW-113B	MW-115A
Chemical Name	GW-1	MCL	MW-103-011411A 1/14/2011 10:50:00 AM	WP-105-012111A 1/21/2011 11:10:00 AM	DUP-02-011811A 1/18/2011 1:20:00 PM	MW-107-011811A 1/18/2011 12:25:00 PM	MW-112A-012011A 1/20/2011 11:10:00 AM	MW-113A-011111A 1/11/2011 2:40:00 PM	MW-113B-011111A 1/11/2011 3:20:00 PM	MW-115A-011310A 1/13/2011 1:30:00 PM
Aluminum			310	220 U	350	280	150	860	1900	1200
ANTIMONY	6	6	20 U	40 U	20 U	20 U	20 U	20 U	20 U	80 U
ARSENIC	10	10	20 U	80 U	20 U	20 U	20 U	20 U	20 U	80 U
Barium	2000	2000	20 U	58	20 U	20 U	20 U	30	41	80 U
Beryllium	4	4	8 U	16 U	8 U	8 U	8 U	8 U	8 U	32 U
Cadmium	5	5	10 U	20 U	10 U	10 U	10 U	10 U	10 U	40 U
Calcium			7800	15000	50000	48000	24000	28000	61000	95000
CHROMIUM	100	100	20 U	40 U	20 U	20 U	75	20 U	25	80 U
Cobalt			20 U	40 U	20 U	20 U	20 U	20 U	20 U	80 U
Copper		1300	20 U	40 U	20 U	20 U	20 U	78	20 U	80 U
Iron			4100	4000	22000	21000	10000	1500	4100	85000
LEAD	15	15	20 U	40 U	20 U	20 U	20 U	20 U	20 U	80 U
Magnesium			1100	3700	4300	4100	3900	2400	3100	30000
Manganese			390	950	1200	1200	1500	93	700	9100
MERCURY	2	2	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	1.2	1.6	0.2 U
NICKEL	100		20 U	40 U	20 U	20 U	47	20 U	22	80 U
Potassium			1900	2400	4700	4600	4500	3900	4000	13000
Selenium	50	50	40 U	40 U	20 U	20 U	20 U	40 U	40 U	160 U
Silver	100		10 U	20 U	10 U	10 U	10 U	10 U	10 U	40 U
Sodium			14000	64000	340000	330000	260000	31000	91000	1000000
THALLIUM	2	2	40 U	40 U	40 U	40 U	40 U	40 U	40 U	80 U
Vandium	30		20 U	40 U	20 U	20 U	20 U	20 U	20 U	80 U
Zinc	5000		22	40 U	20 U	20 U	20 U	330	63	630

**Notes:**

1. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
2. U = below detection limit
3. GW-1 = MCP Category GW-1 Standards (310 CMR 40.0974(2)
4. MCL = Maximum Containment Level: EPA's National Primary Drinking Water Regulations, updated May 2009.

**Table 3-3**  
**January 2011 Groundwater Analytical Results - Total Metals Analysis**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Sample Location:			MW-201	MW-202	MW-202	MW-203A	MW-203B	MW-204A	MW-302	MW-304A
Chemical Name	GW-1	MCL								
Aluminum			220 U	4700	5700	1100 U	440 U	1500	2800	450
ANTIMONY	6	6	40 U	60 U	60 U	200 U	40 U	20 U	60 U	80 U
ARSENIC	10	10	40 U	60 U	60 U	200 U	72	20 U	60 U	80 U
Barium	2000	2000	40 U	60 U	60 U	200 U	23	32	60 U	80 U
Beryllium	4	4	16 U	24 U	24 U	80 U	16 U	8 U	24 U	32 U
Cadmium	5	5	20 U	30 U	30 U	100 U	20 U	10 U	30 U	40 U
Calcium			33000	22000	22000	330000	32000	39000	83000	620000
CHROMIUM	100	100	40 U	60 U	60 U	200 U	31	130	60 U	80 U
Cobalt			56	60 U	60 U	200 U	40 U	20 U	100	80 U
Copper		1300	40 U	250	310	200 U	40 U	20 U	60 U	80 U
Iron			25000	29000	34000	180000	82000	49000	46000	3800
LEAD	15	15	40 U	60 U	60 U	200 U	40 U	20 U	60 U	80 U
Magnesium			9100	8600	8800	120000	9400	6300	15000	150000
Manganese			4400	3200	3200	21000	4100	2900	4400	43000
MERCURY	2	2	0.2 U	0.96	1.2	0.2 U	0.2 U	0.24	0.2 U	0.27
NICKEL	100		40 U	60 U	60 U	200 U	40 U	<b>160</b>	79	80 U
Potassium			5600	6200	6200	39000	6000	5600	10000	16000
Selenium	50	50	80 U	120 U	120 U	400 U	80 U	40 U	120 U	80 U
Silver	100		20 U	30 U	30 U	100 U	20 U	10 U	30 U	40 U
Sodium			360000	620000	620000	3500000	430000	130000	660000	1400000
THALLIUM	2	2	40 U	60 U	60 U	200 U	80 U	40 U	60 U	160
Vandium	30		40 U	60 U	60 U	200 U	40 U	20 U	60 U	80 U
Zinc	5000		40 U	60 U	60 U	200 U	40 U	25	180	80 U

**Notes:**

1. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
2. U = below detection limit
3. GW-1 = MCP Category GW-1 Standards (310 CMR 40.0974(2))
4. MCL = Maximum Containment Level: EPA's National Primary Drinking Water Regulations, updated May 2009.

**Table 3-3**  
**January 2011 Groundwater Analytical Results - Total Metals Analysis**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Sample Location:			MW-304B	MW-305B	MW-306	RMW-403A	RMW-403B	MW-406A	MW-406B
Chemical Name	GW-1	MCL							
Aluminum			110 U	2000	1800	19000	220	1000	450
ANTIMONY	6	6	20 U	20 U	20 U	20 U	20 U	20 U	20 U
ARSENIC	10	10	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Barium	2000	2000	35	50	130	220	42	320	120
Beryllium	4	4	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Cadmium	5	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Calcium			270000	11000	21000	28000	34000	95000	42000
CHROMIUM	100	100	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Cobalt			20 U	20 U	20 U	20 U	22	27	20 U
Copper		1300	20 U	20 U	20 U	75	20 U	20 U	20 U
Iron			6100	1600	11000	9900	26000	2000	1200
LEAD	15	15	20 U	20 U	20 U	26	20 U	20 U	20 U
Magnesium			110000	1400	6300	4800	6600	16000	9300
Manganese			31000	230	2700	1800	4500	860	1400
MERCURY	2	2	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U
NICKEL	100		20 U	20 U	20 U	20 U	20 U	20 U	20 U
Potassium			18000	2100	4000	4500	5600	2700	5100
Selenium	50	50	20 U	20 U	20 U	20 U	20 U	40 U	40 U
Silver	100		10 U	10 U	10 U	11 U	10 U	10 U	10 U
Sodium			240000	27000	20000	87000	90000	47000	120000
THALLIUM	2	2	110	40 U	40 U	40 U	40 U	40 U	40 U
Vandium	30		20 U	20 U	20 U	20 U	20 U	20 U	20 U
Zinc	5000		37	53	59	77	20 U	22	20 U

**Notes:**

1. All concentrations listed in micrograms per liter ( $\mu\text{g/L}$ ).
2. U = below detection limit
3. GW-1 = MCP Category GW-1 Standards (310 CMR 40.0974(2))
4. MCL = Maximum Containment Level: EPA's National Primary Drinking Water Regulations, updated May 2009.

**Table 3-4**  
**January 2011 Groundwater Analytical Results - Anions**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**

Sample Location Sample ID	P-1 P-01-011111A	RW-1 RW-01-011110A	B-5 B-05-011110A	MW-4A MW-403A-011811A	MW-4B MW-403B-011811A	MW-06A MW-06A-011911A	MW-08 MW-08-011911A	RMW-102 RMW-102-011711A	MW-103 MW-103-011411A	WP-105 WP-105-012111A	MW-107 DUP-02-011811A
Sample Date & Time	1/11/2011 2:55:00 PM	1/11/2011 10:50:00 AM	1/11/2011 11:40:00 AM	1/18/2011 12:00:00 PM	1/18/2011 12:20:00 PM	1/19/2011 10:50:00 AM	1/19/2011	1/17/2011 11:50:00 AM	1/14/2011 10:50:00 AM	1/21/2011 11:10:00 AM	1/18/2011 1:20:00 PM
Chemical Name											
Bromide	0.1 U	0.1 U	0.1 U	0.1 U	0.22	0.1 U	0.1 U	0.2	0.1 U	0.11	0.1 U
Chloride	21	110	140	4.9	110	91	110	73	15	120	330
Fluoride	0.19	0.24	0.24	0.1 U	0.32	0.3	0.22	0.32	0.2	0.21	1.2
Nitrate				0.1 U	1.4 B	0.1 U	6 JB			14 J	0.1 U
Nitrate & Nitrite	3.9	0.1 U	0.32					0.1 UJ	0.1 U		
Nitrate (as Nitrogen)	0.02 U	0.02 U	0.02 U	0.02 U	0.32	0.02 U	1.4	0.02 U	0.02 U	3.2	0.02 U
Nitrite				0.1 U	0.1 U	0.1 U	0.1 UJ			0.1 UJ	0.1 U
Nitrite (as Nitrogen)	0.03 U	0.02 U	0.02 U	0.03 U	0.03 U	0.03 U	0.02 U	0.03 U	0.03 U	0.03 U	0.03 U
Nitrite + Nitrate (as Nitrogen)	0.88		0.07	0.02 U	0.02 U	0.02 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U
o-Phosphate as Phosphorus	0.03 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.03 U	0.03 U	0.03 U	0.02 U
Sulfate	150	210	190	14	110	43	450	17	22	12	400

Sample Location Sample ID	MW-107 MW-107-011811A	MW-112A MW-112A-012011A	MW-113A MW-113A-011111A	MW-113B MW-113B-011111A	MW-115A MW-115A-011310A	MW-201 MW-201-011011A	MW-202 DUP-01-011011A	MW-202 MW-202-011011A	MW-203A MW-203A-011011A	MW-203B MW-203B-011110A	MW-204A MW-204A-011411A
Sample Date & Time	1/18/2011 12:25:00 PM	1/20/2011 11:10:00 AM	1/11/2011 2:40:00 PM	1/11/2011 3:20:00 PM	1/13/2011 1:30:00 PM	1/10/2011 1:35:00 PM	1/10/2011 1:30:00 PM	1/10/2011 12:55:00 PM	1/10/2011 1:50:00 PM	1/11/2011 10:45:00 AM	1/14/2011 10:30:00 AM
Chemical Name											
Bromide	0.1 U	0.1 U	0.1 U	0.1 U	5.7	0.53	1.1	1.2	8.2	0.1 U	0.1
Chloride	330	210	44	120	1700	400	470	470	5200	320	86
Fluoride	1.3	0.78	0.22	0.3	8.4	0.3	0.22	0.23	0.1 U	0.41	1.8
Nitrate	0.1 U	0.1 U									
Nitrate & Nitrite			12	0.1 U	5 U	1 U	1 U	1 U	2.4	0.1 U	0.1 U
Nitrate (as Nitrogen)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Nitrite	0.1 U	0.1 U									
Nitrite (as Nitrogen)	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	0.03 U
Nitrite + Nitrate (as Nitrogen)	0.02 U	0.03 U	0.03 U	0.03 U	1.5 U	0.3 U	0.3 U	0.3 U	0.54		0.03 U
o-Phosphate as Phosphorus	0.02 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	0.03 U
Sulfate	400	140	34	130	1700	340	740	730	2700	550	310

Sample Location Sample ID	MW-302 MW-302-011411A	MW-304A MW-304A-011711A	MW-304B MW-304B-011711A	MW-305B MW-305B-012111A	MW-306 MW-306-012111A	RMW-403A RMW-403A-012011A	RMW-403B RMW-403B-011911A	MW-406A MW-406A-011311A	MW-406B MW-406B-011311A
Sample Date & Time	1/14/2011 10:50:00 AM	1/17/2011 11:55:00 AM	1/17/2011 11:40:00 AM	1/21/2011 10:50:00 AM	1/21/2011 11:00:00 AM	1/20/2011 10:45:00 AM	1/19/2011 11:05:00 AM	1/13/2011 12:00:00 PM	1/13/2011 12:10:00 PM
Chemical Name									
Bromide	0.78	0.1 U	0.1 U	0.15 J	0.1 U	0.13	0.1 U	0.1 U	0.3
Chloride	900	2800	830	39	26	140	170	190	230
Fluoride	0.77	0.1 U	0.23	0.18	1.1	0.67	0.28	1.7	0.37
Nitrate				5.4 J	0.1 UJ	14	0.1 U		
Nitrate & Nitrite	0.1 U	3.5	0.1 U					0.1 U	0.1 U
Nitrate (as Nitrogen)	0.02 U	0.02 U	0.02 U	1.2	0.02 U	3.2	0.02 U	0.02 U	0.02 U
Nitrite				0.1 UJ	0.1 UJ	0.1 UJ	0.1 U		
Nitrite (as Nitrogen)	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Nitrite + Nitrate (as Nitrogen)	0.03 U	0.79	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	0.03 U	0.03 U
o-Phosphate as Phosphorus	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	0.03 U	0.03 U
Sulfate	560	1400	550	41	6.4	34	42	32	33

**Notes:**

1. Results reported in milligrams per liter (mg/L)

2. U = below detection limit, J = quantitation approximate, B = detected in laboratory blank</

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-04B	ALUMINUM	--	--	450		1700		1250	--	--	--	--
MW-04B	BARIUM	2000	--	30		49		19	N	--	N	--
MW-04B	CADMIUM	4	--	0.86 J		10 U		-0.86	N	--	N	--
MW-04B	CALCIUM	--	--	82000		52000		-30000	--	--	--	--
MW-04B	COBALT	--	--	1.2 J		20 U		-1.2	--	--	--	--
MW-04B	COPPER	--	--	4.5 J		20 U		-4.5	--	--	--	--
MW-04B	IRON	--	--	1200 J		4100		2900	--	--	--	--
MW-04B	LEAD	10	--	0.28 J		20 U		-0.28	N	--	N	--
MW-04B	MAGNESIUM	--	--	15000 J		12000		-3000	--	--	--	--
MW-04B	MANGANESE	--	--	1400		450		-950	--	--	--	--
MW-04B	MERCURY	2	--	1.33		0.86		-0.47	N	--	N	--
MW-04B	NICKEL	100	--	9.1 J		20 U		-9.1	N	--	N	--
MW-04B	POTASSIUM	--	--	3900		3000		-900	--	--	--	--
MW-04B	SELENIUM	50	--	0.82		20 U		-0.82	N	--	N	--
MW-04B	SODIUM	--	--	140000		52000		-88000	--	--	--	--
MW-04B	VANADIUM	30	--	2		20 U		-2	N	--	N	--
MW-04B	ZINC	900	--	15		26		11	N	--	N	--
MW-06A	ALUMINUM	--	--	58		5700		5642	--	--	--	--
MW-06A	ANTIMONY	6	--	1.6 J		20 U		-1.6	N	--	N	--
MW-06A	ARSENIC	10	--	19 J		170		151	Y	--	Y	--
MW-06A	BARIUM	2000	--	78		110		32	N	--	N	--
MW-06A	CADMIUM	4	--	0.083 J		10 U		-0.083	N	--	N	--
MW-06A	CALCIUM	--	--	28000 J		26000		-2000	--	--	--	--
MW-06A	CHROMIUM	100	--	30 J		68		38	N	--	N	--
MW-06A	COBALT	--	--	1.7 J		20 U		-1.7	--	--	--	--
MW-06A	COPPER	--	--	2.4 U		21		21	--	--	--	--
MW-06A	IRON	--	--	14000		91000		77000	--	--	--	--
MW-06A	LEAD	10	--	0.77 J		20 U		-0.77	N	--	N	--
MW-06A	MAGNESIUM	--	--	2400		4000		1600	--	--	--	--
MW-06A	MANGANESE	--	--	350		360		10	--	--	--	--
MW-06A	MERCURY	2	--	0.13		0.5 U		-0.13	N	--	N	--
MW-06A	NICKEL	100	--	3.7 J		20 U		-3.7	N	--	N	--
MW-06A	POTASSIUM	--	--	5000		6400		1400	--	--	--	--
MW-06A	SELENIUM	50	--	0.55 J		20 U		-0.55	N	--	N	--
MW-06A	SILVER	7	--	0.17 J		10 U		-0.17	N	--	N	--
MW-06A	SODIUM	--	--	100000		51000		-49000	--	--	--	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-06A	THALLIUM	2	--	0.083 J		40 U		-0.083	N	--	N	--
MW-06A	VANADIUM	30	--	6.9 U		24		24	N	--	N	--
MW-06A	ZINC	900	--	6.9 U		36		36	N	--	N	--
MW-107	ALUMINUM	--	--	310		315		5	--	--	--	--
MW-107	ANTIMONY	6	--	0.19 J		20 U		-0.19	N	--	N	--
MW-107	ARSENIC	10	--	4		20 U		-4	N	--	N	--
MW-107	BARIUM	2000	--	21		20 U		-21	N	--	N	--
MW-107	BERYLLIUM	4	--	2		8 U		-2	N	--	N	--
MW-107	CALCIUM	--	--	77000 J		49000		-28000	--	--	--	--
MW-107	CHROMIUM	100	--	7.3 J		20 U		-7.3	N	--	N	--
MW-107	COBALT	--	--	27 J		20 U		-27	--	--	--	--
MW-107	COPPER	--	--	8.5 J		20 U		-8.5	--	--	--	--
MW-107	IRON	--	--	38000		21500		-16500	--	--	--	--
MW-107	LEAD	10	--	0.14 J		20 U		-0.14	N	--	N	--
MW-107	MAGNESIUM	--	--	7000		4200		-2800	--	--	--	--
MW-107	MANGANESE	--	--	2300		1200		-1100	--	--	--	--
MW-107	MERCURY	2	--	0.16		0.2 U		-0.16	N	--	N	--
MW-107	NICKEL	100	--	35 J		20 U		-35	N	--	N	--
MW-107	POTASSIUM	--	--	6500		4650		-1850	--	--	--	--
MW-107	SELENIUM	50	--	1.4		20 U		-1.4	N	--	N	--
MW-107	SODIUM	--	--	680000		335000		-345000	--	--	--	--
MW-107	ZINC	900	--	8.7 J		20 U		-8.7	N	--	N	--
MW-113B	ALUMINUM	--	--	190		1900		1710	--	--	--	--
MW-113B	ANTIMONY	6	--	6.0		20 U		-6	Y	--	N	--
MW-113B	ARSENIC	10	--	2.9 J		20 U		-2.9	N	--	N	--
MW-113B	BARIUM	2000	--	47		41		-6	N	--	N	--
MW-113B	BERYLLIUM	4	--	0.06		8 U		-0.06	N	--	N	--
MW-113B	CADMIUM	4	--	0.33		10 U		-0.33	N	--	N	--
MW-113B	CALCIUM	--	--	29500 J		61000		31500	--	--	--	--
MW-113B	CHROMIUM	100	--	6		25		19	N	--	N	--
MW-113B	COBALT	--	--	1.2		20 U		-1.2	--	--	--	--
MW-113B	COPPER	--	--	12 J		20 U		-12	--	--	--	--
MW-113B	IRON	--	--	440		4100		3660	--	--	--	--
MW-113B	LEAD	10	--	.86		20 U		-0.86	N	--	N	--
MW-113B	MAGNESIUM	--	--	1600		3100		1500	--	--	--	--
MW-113B	MANGANESE	--	--	74		700		626	--	--	--	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-113B	MERCURY	2	--	0.79		1.6		0.81	N	--	N	--
MW-113B	NICKEL	100	--	4.3		22		17.7	N	--	N	--
MW-113B	POTASSIUM	--	--	4900		4000		-900	--	--	--	--
MW-113B	SELENIUM	50	--	0.32		40 U		-0.32	N	--	N	--
MW-113B	SODIUM	--	--	17500		91000		73500	--	--	--	--
MW-113B	THALLIUM	2	--	0.049 J		40 U		-0.049	N	--	N	--
MW-113B	ZINC	900	--	79		63		-16	N	--	N	--
MW-115A	ALUMINUM	--	--	170		1200		1030	--	--	--	--
MW-115A	ANTIMONY	6	--	1.9 J		80 U		-1.9	N	--	N	--
MW-115A	ARSENIC	10	--	20 J		80 U		-20	Y	--	N	--
MW-115A	BARIUM	2000	--	42		80 U		-42	N	--	N	--
MW-115A	BERYLLIUM	4	--	1.2		32 U		-1.2	N	--	N	--
MW-115A	CADMUM	4	--	0.17 J		40 U		-0.17	N	--	N	--
MW-115A	CALCIUM	--	--	950000 J		95000		-855000	--	--	--	--
MW-115A	CHROMIUM	100	--	7.3 J		80 U		-7.3	N	--	N	--
MW-115A	COBALT	--	--	9.7 J		80 U		-9.7	--	--	--	--
MW-115A	COPPER	--	--	19 J		80 U		-19	--	--	--	--
MW-115A	IRON	--	--	69000		85000		16000	--	--	--	--
MW-115A	LEAD	10	--	0.17 J		80 U		-0.17	N	--	N	--
MW-115A	MAGNESIUM	--	--	140000		30000		-110000	--	--	--	--
MW-115A	MANGANESE	--	--	48000		9100		-38900	--	--	--	--
MW-115A	MERCURY	2	--	0.22		0.2 U		-0.22	N	--	N	--
MW-115A	NICKEL	100	--	45 J		80 U		-45	N	--	N	--
MW-115A	POTASSIUM	--	--	12000		13000		1000	--	--	--	--
MW-115A	SELENIUM	50	--	6.1		160 U		-6.1	N	--	N	--
MW-115A	SILVER	7	--	0.061 J		40 U		-0.061	N	--	N	--
MW-115A	SODIUM	--	--	1900000		1000000		-900000	--	--	--	--
MW-115A	VANADIUM	30	--	13 J		80 U		-13	N	--	N	--
MW-115A	ZINC	900	--	22		630		608	N	--	N	--
MW-201	ALUMINUM	--	--	120		220 U		-120	--	--	--	--
MW-201	ARSENIC	10	--	36 J		40 U		-36	Y	--	N	--
MW-201	BARIUM	2000	--	21		40 U		-21	N	--	N	--
MW-201	BERYLLIUM	4	--	0.48		16 U		-0.48	N	--	N	--
MW-201	CADMUM	4	--	0.062 J		20 U		-0.062	N	--	N	--
MW-201	CALCIUM	--	--	58000		33000		-25000	--	--	--	--
MW-201	CHROMIUM	100	--	17 J		40 U		-17	N	--	N	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-201	COBALT	--	--	110		56		-54	--	--	--	--
MW-201	COPPER	--	--	6.8 J		40 U		-6.8	--	--	--	--
MW-201	IRON	--	--	52000 J		25000		-27000	--	--	--	--
MW-201	LEAD	10	--	0.63 J		40 U		-0.63	N	--	N	--
MW-201	MAGNESIUM	--	--	15000		9100		-5900	--	--	--	--
MW-201	MANGANESE	--	--	9600		4400		-5200	--	--	--	--
MW-201	MERCURY	2	--	0.063		0.2 U		-0.063	N	--	N	--
MW-201	NICKEL	100	--	54 J		40 U		-54	N	--	N	--
MW-201	POTASSIUM	--	--	7500		5600		-1900	--	--	--	--
MW-201	SELENIUM	50	--	1.9		80 U		-1.9	N	--	N	--
MW-201	SODIUM	--	--	650000		360000		-290000	--	--	--	--
MW-201	VANADIUM	30	--	19 J		40 U		-19	N	--	N	--
MW-201	ZINC	900	--	12		40 U		-12	N	--	N	--
MW-202	ALUMINUM	--	--	990		5200		4210	--	--	--	--
MW-202	ANTIMONY	6	--	0.17 J		60 U		-0.17	N	--	N	--
MW-202	ARSENIC	10	--	7.6 J		60 U		-7.6	N	--	N	--
MW-202	BARIUM	2000	--	14		60 U		-14	N	--	N	--
MW-202	BERYLLIUM	4	--	1.1		24 U		-1.1	N	--	N	--
MW-202	CADMIUM	4	--	0.4 J		30 U		-0.4	N	--	N	--
MW-202	CALCIUM	--	--	35000		22000		-13000	--	--	--	--
MW-202	CHROMIUM	100	--	37 J		60 U		-37	N	--	N	--
MW-202	COBALT	--	--	38 J		60 U		-38	--	--	--	--
MW-202	COPPER	--	--	75 J		280		205	--	--	--	--
MW-202	IRON	--	--	42000 J		31500		-10500	--	--	--	--
MW-202	LEAD	10	--	4.7 J		60 U		-4.7	N	--	N	--
MW-202	MAGNESIUM	--	--	10000		8700		-1300	--	--	--	--
MW-202	MANGANESE	--	--	5000		3200		-1800	--	--	--	--
MW-202	MERCURY	2	--	0.28		1.1		0.82	N	--	N	--
MW-202	NICKEL	100	--	46		60 U		-46	N	--	N	--
MW-202	POTASSIUM	--	--	6800		6200		-600	--	--	--	--
MW-202	SELENIUM	50	--	3.8		120 U		-3.8	N	--	N	--
MW-202	SODIUM	--	--	870000		620000		-250000	--	--	--	--
MW-202	THALLIUM	2	--	0.075 U		60 U		0	N	--	N	--
MW-202	VANADIUM	30	--	5.4 J		60 U		-5.4	N	--	N	--
MW-202	ZINC	900	--	76		60 U		-76	N	--	N	--
MW-203A	ALUMINUM	--	--	300		1100 U		-300	--	--	--	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-203A	ANTIMONY	6	--	4.1 J		200 U		-4.1	N	--	N	--
MW-203A	ARSENIC	10	--	39 J		200 U		-39	Y	--	N	--
MW-203A	BARIUM	2000	--	27		200 U		-27	N	--	N	--
MW-203A	BERYLLIUM	4	--	1.2		80 U		-1.2	N	--	N	--
MW-203A	CADMIUM	4	--	0.11		100 U		-0.11	N	--	N	--
MW-203A	CALCIUM	--	--	580000 J		330000		-250000	--	--	--	--
MW-203A	CHROMIUM	100	--	28 J		200 U		-28	N	--	N	--
MW-203A	COBALT	--	--	11 J		200 U		-11	--	--	--	--
MW-203A	COPPER	--	--	79 J		200 U		-79	--	--	--	--
MW-203A	IRON	--	--	360000		180000		-180000	--	--	--	--
MW-203A	LEAD	10	--	0.76 J		200 U		-0.76	N	--	N	--
MW-203A	MAGNESIUM	--	--	190000		120000		-70000	--	--	--	--
MW-203A	MANGANESE	--	--	31000		21000		-10000	--	--	--	--
MW-203A	MERCURY	2	--	0.32		0.2 U		-0.32	N	--	N	--
MW-203A	NICKEL	100	--	32 J		200 U		-32	N	--	N	--
MW-203A	POTASSIUM	--	--	56000		39000		-17000	--	--	--	--
MW-203A	SILVER	7	--	0.16 J		100 U		-0.16	N	--	N	--
MW-203A	SODIUM	--	--	5600000		3500000		-2100000	--	--	--	--
MW-203A	VANADIUM	30	--	29 J		200 U		-29	N	--	N	--
MW-203A	ZINC	900	--	32		200 U		-32	N	--	N	--
MW-203B	ALUMINUM	--	--	16		440 U		-16	--	--	--	--
MW-203B	ANTIMONY	6	--	0.19 J		40 U		-0.19	N	--	N	--
MW-203B	ARSENIC	10	--	17 J		72		55	Y	--	Y	--
MW-203B	BARIUM	2000	--	24		23		-1	N	--	N	--
MW-203B	CADMIUM	4	--	0.078 J		20 U		-0.078	N	--	N	--
MW-203B	CALCIUM	--	--	42000 J		32000		-10000	--	--	--	--
MW-203B	CHROMIUM	100	--	31 J		31		0	N	--	N	--
MW-203B	COBALT	--	--	7.6 J		40 U		-7.6	--	--	--	--
MW-203B	COPPER	--	--	12 J		40 U		-12	--	--	--	--
MW-203B	IRON	--	--	70000		82000		12000	--	--	--	--
MW-203B	LEAD	10	--	0.3 J		40 U		-0.3	N	--	N	--
MW-203B	MAGNESIUM	--	--	11000		9400		-1600	--	--	--	--
MW-203B	MANGANESE	--	--	6800		4100		-2700	--	--	--	--
MW-203B	MERCURY	2	--	0.11		0.2 U		-0.11	N	--	N	--
MW-203B	NICKEL	100	--	25 J		40 U		-25	N	--	N	--
MW-203B	POTASSIUM	--	--	7400		6000		-1400	--	--	--	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-203B	SELENIUM	50	--	1.7		80 U		-1.7	N	--	N	--
MW-203B	SODIUM	--	--	700000		430000		-270000	--	--	--	--
MW-203B	ZINC	900	--	14		40 U		-14	N	--	N	--
MW-204A	ALUMINUM	--	--	24000		1500		-22500	--	--	--	--
MW-204A	ANTIMONY	6	--	3.6 J		20 U		-3.6	N	--	N	--
MW-204A	ARSENIC	10	--	22 J		20 U		-22	Y	--	N	--
MW-204A	BARIUM	2000	--	55		32		-23	N	--	N	--
MW-204A	BERYLLIUM	4	--	18		8 U		-18	Y	--	N	--
MW-204A	CADMIUM	4	--	20 J		10 U		-20	Y	--	N	--
MW-204A	CALCIUM	--	--	450000 J		39000		-411000	--	--	--	--
MW-204A	CHROMIUM	100	--	2900		130		-2770	Y	--	Y	--
MW-204A	COBALT	--	--	320		20 U		-320	--	--	--	--
MW-204A	COPPER	--	--	140 J		20 U		-140	--	--	--	--
MW-204A	IRON	--	--	58000		49000		-9000	--	--	--	--
MW-204A	LEAD	10	--	10 J		20 U		-10	Y	--	N	--
MW-204A	MAGNESIUM	--	--	200000		6300		-193700	--	--	--	--
MW-204A	MANGANESE	--	--	110000		2900		-107100	--	--	--	--
MW-204A	MERCURY	2	--	14.3		0.24		-14.06	Y	--	N	--
MW-204A	NICKEL	100	--	490 J		160		-330	Y	--	Y	--
MW-204A	POTASSIUM	--	--	23000		5600		-17400	--	--	--	--
MW-204A	SELENIUM	50	--	4.9		40 U		-4.9	N	--	N	--
MW-204A	SILVER	7	--	1.4 J		10 U		-1.4	N	--	N	--
MW-204A	SODIUM	--	--	2000000		130000		-1870000	--	--	--	--
MW-204A	VANADIUM	30	--	32 J		20 U		-32	Y	--	N	--
MW-204A	ZINC	900	--	720		25		-695	N	--	N	--
MW-302	ALUMINUM	--	--	2600		2800		200	--	--	--	--
MW-302	ANTIMONY	6	--	0.85 J		60 U		-0.85	N	--	N	--
MW-302	ARSENIC	10	--	6.1 J		60 U		-6.1	N	--	N	--
MW-302	BARIUM	2000	--	17		60 U		-17	N	--	N	--
MW-302	BERYLLIUM	4	--	3.1		24 U		-3.1	N	--	N	--
MW-302	CADMIUM	4	--	2.5 J		30 U		-2.5	N	--	N	--
MW-302	CALCIUM	--	--	120000 J		83000		-37000	--	--	--	--
MW-302	CHROMIUM	100	--	6 J		60 U		-6	N	--	N	--
MW-302	COBALT	--	--	140		100		-40	--	--	--	--
MW-302	COPPER	--	--	35 J		60 U		-35	--	--	--	--
MW-302	IRON	--	--	67000		46000		-21000	--	--	--	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-302	LEAD	10	--	1.8 J		60 U		-1.8	N	--	N	--
MW-302	MAGNESIUM	--	--	21000		15000		-6000	--	--	--	--
MW-302	MANGANESE	--	--	5700		4400		-1300	--	--	--	--
MW-302	MERCURY	2	--	0.1		0.2 U		-0.1	N	--	N	--
MW-302	NICKEL	100	--	110 J		79		-31	Y	--	N	--
MW-302	POTASSIUM	--	--	11000		10000		-1000	--	--	--	--
MW-302	SELENIUM	50	--	3.5		120 U		-3.5	N	--	N	--
MW-302	SILVER	7	--	0.2 J		30 U		-0.2	N	--	N	--
MW-302	SODIUM	--	--	900000		660000		-240000	--	--	--	--
MW-302	THALLIUM	2	--	0.15		60 U		-0.15	N	--	N	--
MW-302	ZINC	900	--	300		180		-120	N	--	N	--
MW-304A	ALUMINUM	--	--	31		450		419	--	--	--	--
MW-304A	ANTIMONY	6	--	2.9 J		80 U		-2.9	N	--	N	--
MW-304A	ARSENIC	10	--	20 J		80 U		-20	Y	--	N	--
MW-304A	BARIUM	2000	--	56		80 U		-56	N	--	N	--
MW-304A	CADMUM	4	--	3.3 J		40 U		-3.3	N	--	N	--
MW-304A	CALCIUM	--	--	860000 J		620000		-240000	--	--	--	--
MW-304A	CHROMIUM	100	--	6.3 J		80 U		-6.3	N	--	N	--
MW-304A	COBALT	--	--	48 J		80 U		-48	--	--	--	--
MW-304A	COPPER	--	--	21 J		80 U		-21	--	--	--	--
MW-304A	IRON	--	--	6600		3800		-2800	--	--	--	--
MW-304A	LEAD	10	--	0.46 J		80 U		-0.46	N	--	N	--
MW-304A	MAGNESIUM	--	--	220000		150000		-70000	--	--	--	--
MW-304A	MANGANESE	--	--	64000		43000		-21000	--	--	--	--
MW-304A	MERCURY	2	--	0.18		0.27		0.09	N	--	N	--
MW-304A	NICKEL	100	--	50 J		80 U		-50	N	--	N	--
MW-304A	POTASSIUM	--	--	18000		16000		-2000	--	--	--	--
MW-304A	SELENIUM	50	--	10		80 U		-10	N	--	N	--
MW-304A	SILVER	7	--	0.1 J		40 U		-0.1	N	--	N	--
MW-304A	SODIUM	--	--	1700000		1400000		-300000	--	--	--	--
MW-304A	THALLIUM	2	--	0.075 U		160		160	N	--	Y	--
MW-304A	VANADIUM	30	--	12 J		80 U		-12	N	--	N	--
MW-304A	ZINC	900	--	35		80 U		-35	N	--	N	--
MW-304B	ALUMINUM	--	--	67		110 U		-67	--	--	--	--
MW-304B	ANTIMONY	6	--	0.18 J		20 U		-0.18	N	--	N	--
MW-304B	ARSENIC	10	--	17 J		20 U		-17	Y	--	N	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-304B	BARIUM	2000	--	76		35		-41	N	--	N	--
MW-304B	CADMIUM	4	--	0.071 J		10 U		-0.071	N	--	N	--
MW-304B	CALCIUM	--	--	280000 J		270000		-10000	--	--	--	--
MW-304B	CHROMIUM	100	--	5.5 J		20 U		-5.5	N	--	N	--
MW-304B	COBALT	--	--	9 J		20 U		-9	--	--	--	--
MW-304B	IRON	--	--	9700		6100		-3600	--	--	--	--
MW-304B	LEAD	10	--	0.78 J		20 U		-0.78	N	--	N	--
MW-304B	MAGNESIUM	--	--	110000		110000		0	--	--	--	--
MW-304B	MANGANESE	--	--	34000		31000		-3000	--	--	--	--
MW-304B	MERCURY	2	--	0.052		0.2 U		-0.052	N	--	N	--
MW-304B	NICKEL	100	--	16 J		20 U		-16	N	--	N	--
MW-304B	POTASSIUM	--	--	17000		18000		1000	--	--	--	--
MW-304B	SELENIUM	50	--	0.96		20 U		-0.96	N	--	N	--
MW-304B	SODIUM	--	--	270000		240000		-30000	--	--	--	--
MW-304B	THALLIUM	2	--	0.075 U		110		110	N	--	Y	--
MW-304B	ZINC	900	--	15		37		22	N	--	N	--
MW-306	ALUMINUM	--	--	2200		1800		-400	--	--	--	--
MW-306	ARSENIC	10	--	2.2		20 U		-2.2	N	--	N	--
MW-306	BARIUM	2000	--	240		130		-110	N	--	N	--
MW-306	BERYLLIUM	4	--	0.11 J		8 U		-0.11	N	--	N	--
MW-306	CADMIUM	4	--	0.58		10 U		-0.58	N	--	N	--
MW-306	CALCIUM	--	--	17000		21000		4000	--	--	--	--
MW-306	CHROMIUM	100	--	6.2		20 U		-6.2	N	--	N	--
MW-306	COBALT	--	--	3.3		20 U		-3.3	--	--	--	--
MW-306	COPPER	--	--	5.2		20 U		-5.2	--	--	--	--
MW-306	IRON	--	--	13000 J		11000		-2000	--	--	--	--
MW-306	LEAD	10	--	5.5		20 U		-5.5	N	--	N	--
MW-306	MAGNESIUM	--	--	5900 J		6300		400	--	--	--	--
MW-306	MANGANESE	--	--	2200		2700		500	--	--	--	--
MW-306	MERCURY	2	--	0.0087		0.5 U		-0.0087	N	--	N	--
MW-306	NICKEL	100	--	4.9		20 U		-4.9	N	--	N	--
MW-306	POTASSIUM	--	--	3700		4000		300	--	--	--	--
MW-306	SODIUM	--	--	10000		20000		10000	--	--	--	--
MW-306	VANADIUM	30	--	5.9		20 U		-5.9	N	--	N	--
MW-306	ZINC	900	--	66		59		-7	N	--	N	--
RMW-102	ALUMINUM	--	--	90		670		580	--	--	--	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
RMW-102	BARIUM	2000	--	14	20 U	-14	N	--	N	--	--	--
RMW-102	CADMIUM	4	--	0.1 J	10 U	-0.1	N	--	N	--	--	--
RMW-102	CALCIUM	--	--	4900	7400	2500	--	--	--	--	--	--
RMW-102	COBALT	--	--	1.8 J	20 U	-1.8	--	--	--	--	--	--
RMW-102	IRON	--	--	180 J	1000	820	--	--	--	--	--	--
RMW-102	LEAD	10	--	0.22 J	20 U	-0.22	N	--	N	--	--	--
RMW-102	MAGNESIUM	--	--	720 J	1300	580	--	--	--	--	--	--
RMW-102	MANGANESE	--	--	340	490	150	--	--	--	--	--	--
RMW-102	MERCURY	2	--	0.0013	0.2 U	-0.0013	N	--	N	--	--	--
RMW-102	POTASSIUM	--	--	1700 J	2000	300	--	--	--	--	--	--
RMW-102	SELENIUM	50	--	0.43 J	20 U	-0.43	N	--	N	--	--	--
RMW-102	SODIUM	--	--	59000	57000	-2000	--	--	--	--	--	--
RMW-102	VANADIUM	30	--	1.6 J	20 U	-1.6	N	--	N	--	--	--
RMW-403B	ALUMINUM	--	--	45	220	175	--	--	--	--	--	--
RMW-403B	ARSENIC	10	--	3.5 J	20 U	-3.5	N	--	N	--	--	--
RMW-403B	BARIUM	2000	--	30	42	12	N	--	N	--	--	--
RMW-403B	CADMIUM	4	--	0.41 J	10 U	-0.41	N	--	N	--	--	--
RMW-403B	CALCIUM	--	--	32000	34000	2000	--	--	--	--	--	--
RMW-403B	COBALT	--	--	11	22	11	--	--	--	--	--	--
RMW-403B	IRON	--	--	14000 J	26000	12000	--	--	--	--	--	--
RMW-403B	LEAD	10	--	0.61 J	20 U	-0.61	N	--	N	--	--	--
RMW-403B	MAGNESIUM	--	--	5700 J	6600	900	--	--	--	--	--	--
RMW-403B	MANGANESE	--	--	5400	4500	-900	--	--	--	--	--	--
RMW-403B	NICKEL	100	--	8.1 J	20 U	-8.1	N	--	N	--	--	--
RMW-403B	POTASSIUM	--	--	5300 J	5600	300	--	--	--	--	--	--
RMW-403B	SELENIUM	50	--	0.41 J	20 U	-0.41	N	--	N	--	--	--
RMW-403B	SODIUM	--	--	70000	90000	20000	--	--	--	--	--	--
RMW-403B	VANADIUM	30	--	1.3 J	20 U	-1.3	N	--	N	--	--	--
RMW-403B	ZINC	900	--	7.4 J	20 U	-7.4	N	--	N	--	--	--
WP-105	ALUMINUM	--	--	55	220 U	-55	--	--	--	--	--	--
WP-105	ARSENIC	10	--	1.1 J	80 U	-1.1	N	--	N	--	--	--
WP-105	BARIUM	2000	--	82	58	-24	N	--	N	--	--	--
WP-105	CALCIUM	--	--	18000	15000	-3000	--	--	--	--	--	--
WP-105	CHROMIUM	100	--	1.17 J	40 U	-1.17	N	--	N	--	--	--
WP-105	COBALT	--	--	0.19 J	40 U	-0.19	--	--	--	--	--	--
WP-105	IRON	--	--	3050 J	4000	950	--	--	--	--	--	--

**Table 3-5a**  
**Comparison of Detected Metals Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW- 1?	2003 Exceed GW- 2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
WP-105	LEAD	10	--	0.43 J		40 U		-0.43	N	--	N	--
WP-105	MAGNESIUM	--	--	4300 J		3700		-600	--	--	--	--
WP-105	MANGANESE	--	--	980		950		-30	--	--	--	--
WP-105	MERCURY	2	--	0.001		0.5 U		-0.001	N	--	N	--
WP-105	NICKEL	100	--	1.3 J		40 U		-1.3	N	--	N	--
WP-105	POTASSIUM	--	--	3050		2400		-650	--	--	--	--
WP-105	SELENIUM	50	--	0.19 J		40 U		-0.19	N	--	N	--
WP-105	SODIUM	--	--	67000		64000		-3000	--	--	--	--
WP-105	VANADIUM	30	--	1.3 J		40 U		-1.3	N	--	N	--
WP-105	ZINC	900	--	3.5 J		40 U		-3.5	N	--	N	--

**Notes:** Results and qualifiers in *italics* indicate an average result from a duplicate pair.

Results and qualifiers in **bold** indicate an exceedance of one or more action levels.

**Table 3-5b**  
**Comparison of VOC Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-04B	1,2-Dichloroethene (total)	--	--	11		--		--	--	--	--	--
MW-04B	CHLOROBENZENE	100	200	1.7 J		1 U		-1.7	N	N	N	N
MW-04B	CIS-1,2-DICHLOROETHENE	70	100	11		1.3		-9.7	N	N	N	N
MW-04B	TRICHLOROETHENE	5	30	100		16		-84	Y	Y	Y	N
MW-06A	1,2-Dichloroethene (total)	--	--	240		--		--	--	--	--	--
MW-06A	CHLOROBENZENE	100	200	110		22		-88	Y	N	N	N
MW-06A	CIS-1,2-DICHLOROETHENE	70	100	230		96		-134	Y	Y	Y	N
MW-06A	TRANS-1,2-DICHLOROETHENE	90	90	8.6		2.2		-6.4	N	N	N	N
MW-06A	TRICHLOROETHENE	5	30	37		10		-27	Y	Y	Y	N
MW-06A	VINYL CHLORIDE	2	2.0	4 U		1.3		1.3	N	N	N	N
MW-107	1,2-Dichloroethene (total)	--	--	250		--		--	--	--	--	--
MW-107	ACETONE	6300	50000	10 U		11		11	N	N	N	N
MW-107	BENZENE	5	2000	11		10 U		-11	N	N	N	N
MW-107	CHLOROBENZENE	100	200	400		170		-230	Y	Y	Y	N
MW-107	CIS-1,2-DICHLOROETHENE	70	100	250		175		-75	Y	Y	Y	Y
MW-107	TRICHLOROETHENE	5	30	360		36		-324	Y	Y	Y	Y
MW-113B	1,2-Dichloroethene (total)	--	--	13 J		--		--	--	--	--	--
MW-113B	CHLOROBENZENE	100	200	6.6 J		1700		1693.4	N	N	Y	Y
MW-113B	CIS-1,2-DICHLOROETHENE	70	100	13 J		500 U		-13	N	N	N	N
MW-113B	TRICHLOROETHENE	5	30	12		8700		8688	Y	N	Y	Y
MW-113B	VINYL CHLORIDE	2	2.0	5.4		500 U		-5.4	Y	Y	N	N
MW-115A	1,2-Dichloroethene (total)	--	--	200 J		--		--	--	--	--	--
MW-115A	CHLOROBENZENE	100	200	2900 J		190		-2710	Y	Y	Y	N
MW-115A	CIS-1,2-DICHLOROETHENE	70	100	200 J		67		-133	Y	Y	N	N
MW-115A	TRICHLOROETHENE	5	30	4300		640		-3660	Y	Y	Y	Y
MW-201	1,2-Dichloroethene (total)	--	--	180		--		--	--	--	--	--
MW-201	BENZENE	5	2000	28		10		-18	Y	N	Y	N
MW-201	CHLOROBENZENE	100	200	1100		400		-700	Y	Y	Y	Y
MW-201	CIS-1,2-DICHLOROETHENE	70	100	180		130		-50	Y	Y	Y	Y
MW-201	ETHYLBENZENE	700	20000	20 U		1.1		1.1	N	N	N	N
MW-201	TRICHLOROETHENE	5	30	1100		240		-860	Y	Y	Y	Y
MW-201	VINYL CHLORIDE	2	2.0	20 U		2.3		2.3	N	N	Y	Y
MW-202	1,2-Dichloroethene (total)	--	--	410		--		--	--	--	--	--
MW-202	ACETONE	6300	50000	100 U		1.3		1.3	N	N	N	N
MW-202	BENZENE	5	2000	63		15.8		-47.2	Y	N	Y	N
MW-202	CHLOROBENZENE	100	200	2400		710		-1690	Y	Y	Y	Y

**Table 3-5b**  
**Comparison of VOC Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-202	CIS-1,2-DICHLOROETHENE	70	100	410		100		-310	Y	Y	Y	Y
MW-202	ETHYLBENZENE	700	20000	40 U	2	2		N	N	N	N	N
MW-202	TRANS-1,2-DICHLOROETHENE	90	90	40 U		1.1		1.1	N	N	N	N
MW-202	TRICHLOROETHENE	5	30	1900		385		-1515	Y	Y	Y	Y
MW-202	VINYL CHLORIDE	2	2.0	40 U		3		3	N	N	Y	Y
MW-203A	1,1-DICHLOROETHENE	7	80	200 U		3.5		3.5	N	N	N	N
MW-203A	1,2-DICHLOROETHANE	5	5.0	200 U		1.7		1.7	N	N	N	N
MW-203A	1,2-Dichloroethene (total)	--	--	630 J		--		--	--	--	--	--
MW-203A	2-BUTANONE	4000	50000	200 U		1.4		1.4	N	N	N	N
MW-203A	ACETONE	6300	50000	200 U		3.9		3.9	N	N	N	N
MW-203A	BENZENE	5	2000	200		67.6		-132.4	Y	N	Y	N
MW-203A	CHLOROBENZENE	100	200	9000 J		3600		-5400	Y	Y	Y	Y
MW-203A	CIS-1,2-DICHLOROETHENE	70	100	630 J		110		-520	Y	Y	Y	Y
MW-203A	ETHYLBENZENE	700	20000	200 U		1		1	N	N	N	N
MW-203A	m,p-Xylene	--	--	200 U		3.2		3.2	--	--	--	--
MW-203A	O-XYLENE	--	--	200 U		3.9		3.9	--	--	--	--
MW-203A	TOLUENE	1000	50000	200 U		18.1		18.1	N	N	N	N
MW-203A	TRANS-1,2-DICHLOROETHENE	90	90	200 U		37.2		37.2	N	N	N	N
MW-203A	TRICHLOROETHENE	5	30	3800		500		-3300	Y	Y	Y	Y
MW-203A	VINYL CHLORIDE	2	2.0	100 J		460		360	Y	Y	Y	Y
MW-203B	1,2-Dichloroethene (total)	--	--	350 J		--		--	--	--	--	--
MW-203B	BENZENE	5	2000	40		16		-24	Y	N	Y	N
MW-203B	CHLOROBENZENE	100	200	1000 J		750		-250	Y	Y	Y	Y
MW-203B	CIS-1,2-DICHLOROETHENE	70	100	350 J		170		-180	Y	Y	Y	Y
MW-203B	TRANS-1,2-DICHLOROETHENE	90	90	5.8 J		10 U		-5.8	N	N	N	N
MW-203B	TRICHLOROETHENE	5	30	1200		560		-640	Y	Y	Y	Y
MW-203B	VINYL CHLORIDE	2	2.0	9.5 J		10 U		-9.5	Y	Y	N	N
MW-204A	1,2-Dichloroethene (total)	--	--	140		--		--	--	--	--	--
MW-204A	BENZENE	5	2000	4.5		10 U		-4.5	N	N	N	N
MW-204A	CHLOROBENZENE	100	200	140		55.3		-84.7	Y	N	N	N
MW-204A	CIS-1,2-DICHLOROETHENE	70	100	46		145.2		99.2	N	N	Y	Y
MW-204A	TRICHLOROETHENE	5	30	110		174.8		64.8	Y	Y	Y	Y
MW-204A	VINYL CHLORIDE	2	2.0	2.9 J		15.2		12.3	Y	Y	Y	Y
MW-302	1,2-Dichloroethene (total)	--	--	110		--		--	--	--	--	--
MW-302	BENZENE	5	2000	74		50.1		-23.9	Y	N	Y	N
MW-302	CHLOROBENZENE	100	200	580		435.1		-144.9	Y	Y	Y	Y

**Table 3-5b**  
**Comparison of VOC Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-302	CIS-1,2-DICHLOROETHENE	70	100	110		214.2		104.2	Y	Y	Y	Y
MW-302	TRICHLOROETHENE	5	30	870		335.4		-534.6	Y	Y	Y	Y
MW-304A	1,2-Dichloroethene (total)	--	--	130		--		--	--	--	--	--
MW-304A	BENZENE	5	2000	43		50 U		-43	N	N	N	N
MW-304A	CHLOROBENZENE	100	200	1000		1200		200	Y	Y	Y	Y
MW-304A	CIS-1,2-DICHLOROETHENE	70	100	130		450		320	Y	Y	Y	Y
MW-304A	TRICHLOROETHENE	5	30	1400		2000		600	Y	Y	Y	Y
MW-304A	VINYL CHLORIDE	2	2.0	26		65		39	Y	Y	Y	Y
MW-304B	1,2-Dichloroethene (total)	--	--	140		--		--	--	--	--	--
MW-304B	BENZENE	5	2000	4.5		5 U		-4.5	N	N	N	N
MW-304B	CHLOROBENZENE	100	200	140		120		-20	Y	N	Y	N
MW-304B	CIS-1,2-DICHLOROETHENE	70	100	140		170		30	Y	Y	Y	Y
MW-304B	TRANS-1,2-DICHLOROETHENE	90	90	2.3 J		5 U		-2.3	N	N	N	N
MW-304B	TRICHLOROETHENE	5	30	200		120		-80	Y	Y	Y	Y
MW-304B	VINYL CHLORIDE	2	2.0	6		5.8		-0.2	Y	Y	Y	Y
RMW-102	TETRACHLOROETHENE	5	50	1.3 J		1 U		-1.3	N	N	N	N
RMW-102	TRICHLOROETHENE	5	30	1.6 J		1 U		-1.6	N	N	N	N
WP-105	ACETONE	6300	50000	5 U		1		1	N	N	N	N

**Notes:** Results and qualifiers in *italics* indicate an average result from a duplicate pair.

Results and qualifiers in **bold** indicate an exceedance of one or more action levels.

**Table 3-5c**  
**Comparison of SVOC Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-04B	1,2,4-TRICHLOROBENZENE	70	2000	0.26 J		2.5 U		-0.26	N	N	N	N
MW-04B	1,2-DICHLOROBENZENE	600	2000	0.87		2.5 U		-0.87	N	N	N	N
MW-04B	1,4-DICHLOROBENZENE	5	200	0.34		2.5 U		-0.34	N	N	N	N
MW-04B	4-NITROANILINE	--	--	0.19 J		2.5 U		-0.19	--	--	--	--
MW-04B	Aniline	--	--	0.14 J		2.5 U		-0.14	--	--	--	--
MW-04B	NITROBENZENE	--	--	0.97		2.5 U		-0.97	--	--	--	--
MW-06A	1,2,4-TRICHLOROBENZENE	70	2000	65		64		-1	N	N	N	N
MW-06A	1,2-DICHLOROBENZENE	600	2000	69		31		-38	N	N	N	N
MW-06A	1,3-DICHLOROBENZENE	40	2000	3.2		2.5 U		-3.2	N	N	N	N
MW-06A	1,4-DICHLOROBENZENE	5	200	16		5.3		-10.7	Y	N	Y	N
MW-06A	Aniline	--	--	81		14		-67	--	--	--	--
MW-06A	NAPHTHALENE	140	1000	0.84 J		2.5 U		-0.84	N	N	N	N
MW-107	1,2,4-TRICHLOROBENZENE	70	2000	28		26		-2	N	N	N	N
MW-107	1,2-DICHLOROBENZENE	600	2000	740		375		-365	Y	N	N	N
MW-107	1,3-DICHLOROBENZENE	40	2000	8.1 J		5.3		-2.8	N	N	N	N
MW-107	1,4-DICHLOROBENZENE	5	200	100		55		-45	Y	N	Y	N
MW-107	Aniline	--	--	13 U		3.9		3.9	--	--	--	--
MW-113B	1,2,4-TRICHLOROBENZENE	70	2000	2.6 J		252		249.4	N	N	Y	N
MW-113B	1,2-DICHLOROBENZENE	600	2000	24 J		15954		15930	N	N	Y	Y
MW-113B	1,3-DICHLOROBENZENE	40	2000	1.4 J		592		590.6	N	N	Y	N
MW-113B	1,4-DICHLOROBENZENE	5	200	5.2 J		3535		3529.8	Y	N	Y	Y
MW-113B	3-NITROANILINE	--	--	0.27 U		3		3	--	--	--	--
MW-113B	4-NITROANILINE	--	--	0.27 U		8		8	--	--	--	--
MW-113B	Aniline	--	--	1.65 U		974		974	--	--	--	--
MW-113B	NAPHTHALENE	140	1000	0.27 U		9		9	N	N	N	N
MW-113B	NITROBENZENE	--	--	17 J		41000		40983	--	--	--	--
MW-115A	1,2,4-TRICHLOROBENZENE	70	2000	71 J		120		49	Y	N	Y	N
MW-115A	1,2-DICHLOROBENZENE	600	2000	1000 J		950		-50	Y	N	Y	N
MW-115A	1,3-DICHLOROBENZENE	40	2000	14 UJ		16		16	N	N	N	N
MW-115A	1,4-DICHLOROBENZENE	5	200	180 J		170		-10	Y	N	Y	N
MW-115A	Aniline	--	--	670		860		190	--	--	--	--
MW-115A	NAPHTHALENE	140	1000	30		120		90	N	N	N	N
MW-115A	NITROBENZENE	--	--	29 UJ		4		4	--	--	--	--
MW-201	1,2,4-TRICHLOROBENZENE	70	2000	180		178		-2	Y	N	Y	N
MW-201	1,2-DICHLOROBENZENE	600	2000	680		570		-110	Y	N	N	N
MW-201	1,3-DICHLOROBENZENE	40	2000	16		14		-2	N	N	N	N

**Table 3-5c**  
**Comparison of SVOC Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-201	1,4-DICHLOROBENZENE	5	200	130		113		-17	Y	N	Y	N
MW-201	Aniline	--	--	6.4		4		-2.4	--	--	--	--
MW-202	1,2,4-TRICHLOROBENZENE	70	2000	530		403		-127	Y	N	Y	N
MW-202	1,2-DICHLOROBENZENE	600	2000	1500		1109		-391	Y	N	Y	N
MW-202	1,3-DICHLOROBENZENE	40	2000	34		24		-10	N	N	N	N
MW-202	1,4-DICHLOROBENZENE	5	200	300		196		-104	Y	Y	Y	N
MW-202	Aniline	--	--	41		21		-20	--	--	--	--
MW-202	NAPHTHALENE	140	1000	11 J		2.5 U		-11	N	N	N	N
MW-203A	1,2,4-TRICHLOROBENZENE	70	2000	130 UJ		109		109	N	N	Y	N
MW-203A	1,2-DICHLOROBENZENE	600	2000	1700 J		2265		565	Y	N	Y	Y
MW-203A	1,3-DICHLOROBENZENE	40	2000	130 UJ		55		55	N	N	Y	N
MW-203A	1,4-DICHLOROBENZENE	5	200	270 J		428		158	Y	Y	Y	Y
MW-203A	Aniline	--	--	8900		8232		-668	--	--	--	--
MW-203A	NAPHTHALENE	140	1000	130 U		28.7		28.7	N	N	N	N
MW-203A	NITROBENZENE	--	--	130 UJ		8		8	--	--	--	--
MW-203B	1,2,4-TRICHLOROBENZENE	70	2000	140 J		334		194	Y	N	Y	N
MW-203B	1,2-DICHLOROBENZENE	600	2000	530 J		990		460	N	N	Y	N
MW-203B	1,3-DICHLOROBENZENE	40	2000	11 J		25		14	N	N	N	N
MW-203B	1,4-DICHLOROBENZENE	5	200	93 J		180		87	Y	N	Y	N
MW-203B	Aniline	--	--	34 U		18		18	--	--	--	--
MW-204A	1,2,4-TRICHLOROBENZENE	70	2000	16		7.6		-8.4	N	N	N	N
MW-204A	1,2-DICHLOROBENZENE	600	2000	180		61.5		-118.5	N	N	N	N
MW-204A	1,3-DICHLOROBENZENE	40	2000	5.2		2.6		-2.6	N	N	N	N
MW-204A	1,4-DICHLOROBENZENE	5	200	36		13.3		-22.7	Y	N	Y	N
MW-204A	NITROBENZENE	--	--	30		2.5 U		-30	--	--	--	--
MW-302	1,2,4-TRICHLOROBENZENE	70	2000	15		14.6		-0.4	N	N	N	N
MW-302	1,2-DICHLOROBENZENE	600	2000	490		452.2		-37.8	N	N	N	N
MW-302	1,3-DICHLOROBENZENE	40	2000	6.7		5.4		-1.3	N	N	N	N
MW-302	1,4-DICHLOROBENZENE	5	200	73		50.6		-22.4	Y	N	Y	N
MW-302	Aniline	--	--	360		160.2		-199.8	--	--	--	--
MW-302	NAPHTHALENE	140	1000	66		29.4		-36.6	N	N	N	N
MW-304A	1,2,4-TRICHLOROBENZENE	70	2000	17		34		17	N	N	N	N
MW-304A	1,2-DICHLOROBENZENE	600	2000	370		780		410	N	N	Y	N
MW-304A	1,3-DICHLOROBENZENE	40	2000	8.5		20		11.5	N	N	N	N
MW-304A	1,4-DICHLOROBENZENE	5	200	76		160		84	Y	N	Y	N
MW-304A	Aniline	--	--	9.9 U		3.2		3.2	--	--	--	--

**Table 3-5c**  
**Comparison of SVOC Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Well #:	Chemical:	Year Sampled:		2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
		GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-304A	NITROBENZENE	--	--	82		140		58	--	--	--	--
MW-304B	1,2,4-TRICHLOROBENZENE	70	2000	16	2.5 U	-16	N	N	N	N	N	
MW-304B	1,2-DICHLOROBENZENE	600	2000	180	2.5 U	-180	N	N	N	N	N	
MW-304B	1,3-DICHLOROBENZENE	40	2000	5.2	2.5 U	-5.2	N	N	N	N	N	
MW-304B	1,4-DICHLOROBENZENE	5	200	<b>36</b>	2.5 U	-36	Y	N	N	N	N	
MW-304B	NITROBENZENE	--	--	30	2.5 U	-30	--	--	--	--	--	
MW-306	1,3-DICHLOROBENZENE	40	2000	0.63	2.5 U	-0.63	N	N	N	N	N	
RMW-102	1,2,4-TRICHLOROBENZENE	70	2000	0.29 U	15	15	N	N	N	N	N	
RMW-102	1,2-DICHLOROBENZENE	600	2000	0.13 U	180	180	N	N	N	N	N	
RMW-102	1,3-DICHLOROBENZENE	40	2000	0.18 J	4	3.82	N	N	N	N	N	
RMW-102	1,4-DICHLOROBENZENE	5	200	0.29 U	<b>29</b>	29	N	N	N	Y	N	
RMW-403B	1,3-DICHLOROBENZENE	40	2000	0.41	2.5 U	-0.41	N	N	N	N	N	

**Notes:** Results and qualifiers in *italics* indicate an average result from a duplicate pair.

Results and qualifiers in **bold** indicate an exceedance of one or more action levels.

**Table 3-5d**  
**Comparison of Inorganic Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
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Year Sampled:				2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
Well #:	Chemical:	GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-04B	Alkalinity	--	--	42	--	--	--	--	--	--	--	--
MW-04B	Chloride	--	--	220 J	110	-110	--	--	--	--	--	--
MW-04B	Nitrate (as Nitrogen)	--	--	0.27 UJ	0.32	0.32	--	--	--	--	--	--
MW-04B	Sulfate	--	--	29 J	110	81	--	--	--	--	--	--
MW-06A	Alkalinity	--	--	38	--	--	--	--	--	--	--	--
MW-06A	Chloride	--	--	120 J	91	-29	--	--	--	--	--	--
MW-06A	Sulfate	--	--	110 J	43	-67	--	--	--	--	--	--
MW-107	Alkalinity	--	--	49	--	--	--	--	--	--	--	--
MW-107	Chloride	--	--	700 J	330	-370	--	--	--	--	--	--
MW-107	Sulfate	--	--	700 J	400	-300	--	--	--	--	--	--
MW-113B	Alkalinity	--	--	46	--	--	--	--	--	--	--	--
MW-113B	Chloride	--	--	22 J	120	98	--	--	--	--	--	--
MW-113B	Sulfate	--	--	48 J	130	82	--	--	--	--	--	--
MW-115A	Alkalinity	--	--	82	--	--	--	--	--	--	--	--
MW-115A	Chloride	--	--	3600 J	1700	-1900	--	--	--	--	--	--
MW-115A	Sulfate	--	--	1900 J	1700	-200	--	--	--	--	--	--
MW-201	Alkalinity	--	--	27	--	--	--	--	--	--	--	--
MW-201	Chloride	--	--	870 J	400	-470	--	--	--	--	--	--
MW-201	Sulfate	--	--	630 J	340	-290	--	--	--	--	--	--
MW-202	Alkalinity	--	--	8.5	--	--	--	--	--	--	--	--
MW-202	Chloride	--	--	790 J	470	-320	--	--	--	--	--	--
MW-202	Sulfate	--	--	1100 J	735	-365	--	--	--	--	--	--
MW-203A	Chloride	--	--	7600 J	5200	-2400	--	--	--	--	--	--
MW-203A	Sulfate	--	--	3400 J	2700	-700	--	--	--	--	--	--
MW-203B	Alkalinity	--	--	76	--	--	--	--	--	--	--	--
MW-203B	Chloride	--	--	520 J	320	-200	--	--	--	--	--	--
MW-203B	Sulfate	--	--	810 J	550	-260	--	--	--	--	--	--
MW-204A	Alkalinity	--	--	75	--	--	--	--	--	--	--	--
MW-204A	Chloride	--	--	3000 J	86	-2914	--	--	--	--	--	--
MW-204A	Sulfate	--	--	2600 J	310	-2290	--	--	--	--	--	--
MW-302	Chloride	--	--	1300 J	900	-400	--	--	--	--	--	--
MW-302	Nitrate (as Nitrogen)	--	--	25 J	0.02 U	-25	--	--	--	--	--	--
MW-302	Sulfate	--	--	720 J	560	-160	--	--	--	--	--	--
MW-304A	Alkalinity	--	--	90	--	--	--	--	--	--	--	--
MW-304A	Chloride	--	--	3700 J	2800	-900	--	--	--	--	--	--
MW-304A	Sulfate	--	--	1400 J	1400	0	--	--	--	--	--	--

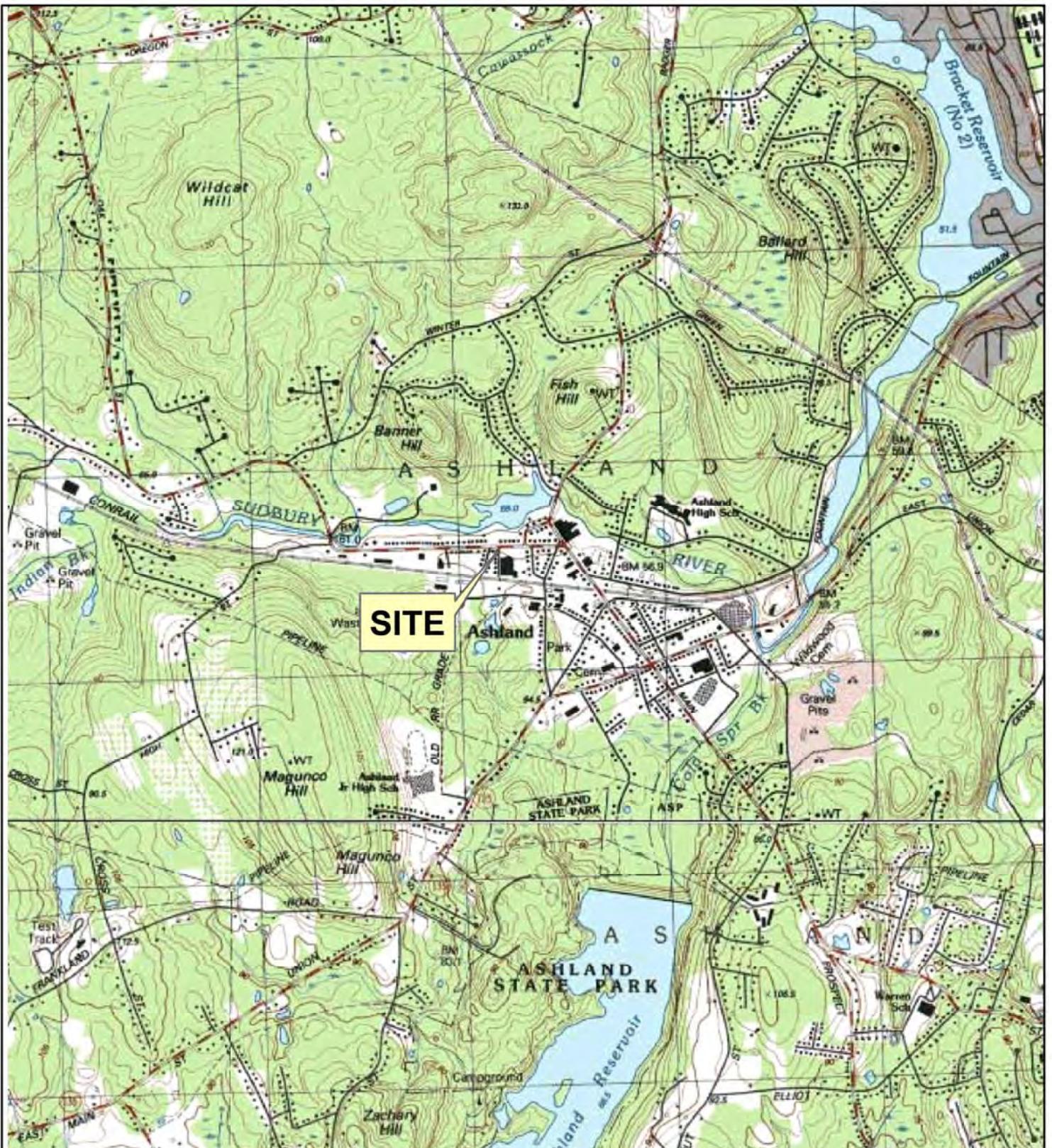
**Table 3-5d**  
**Comparison of Inorganic Detected Compounds - 2003-2011 Sampling Rounds**  
**Nyanza Chemical Waste Dump Superfund Site**  
**Ashland, Massachusetts**  
**Page 2 of 2**

Year Sampled:				2003		2011		2011-2003 Difference	2003 Exceed GW-1?	2003 Exceed GW-2?	2011 Exceed GW-1?	2011 Exceed GW-2?
Well #:	Chemical:	GW-1 Standard	GW-2 Standard	Conc.	Flag	Conc.	Flag					
MW-304B	Alkalinity	--	--	92	--	--	--	--	--	--	--	--
MW-304B	Chloride	--	--	980 J	830	-150	--	--	--	--	--	--
MW-304B	Sulfate	--	--	620 J	550	-70	--	--	--	--	--	--
MW-306	Alkalinity	--	--	80	--	--	--	--	--	--	--	--
MW-306	Chloride	--	--	7.2 J	26	18.8	--	--	--	--	--	--
MW-306	Sulfate	--	--	0.92 J	6.4	5.48	--	--	--	--	--	--
RMW-102	Alkalinity	--	--	33	--	--	--	--	--	--	--	--
RMW-102	Chloride	--	--	59 J	73	14	--	--	--	--	--	--
RMW-102	Sulfate	--	--	16 J	17	1	--	--	--	--	--	--
RMW-403B	Alkalinity	--	--	69	--	--	--	--	--	--	--	--
RMW-403B	Chloride	--	--	130 J	170	40	--	--	--	--	--	--
RMW-403B	Sulfate	--	--	17 J	42	25	--	--	--	--	--	--
WP-105	Alkalinity	--	--	31	--	--	--	--	--	--	--	--
WP-105	Chloride	--	--	125 J	120	-5	--	--	--	--	--	--
WP-105	Nitrate (as Nitrogen)	--	--	0.24 UJ	3.2	3.2	--	--	--	--	--	--
WP-105	Sulfate	--	--	0.25 U	12	12	--	--	--	--	--	--

**Notes:** Results and qualifiers in *italics* indicate an average result from a duplicate pair.

Results and qualifiers in **bold** indicate an exceedance of one or more action levels.

**F  
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USGS TOPOGRAPHIC MAP

AHLAND, MASSACHUSETTS

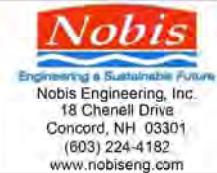
1982

APPROXIMATE SCALE  
1" = 2,000 FEET

Quadrangle Location

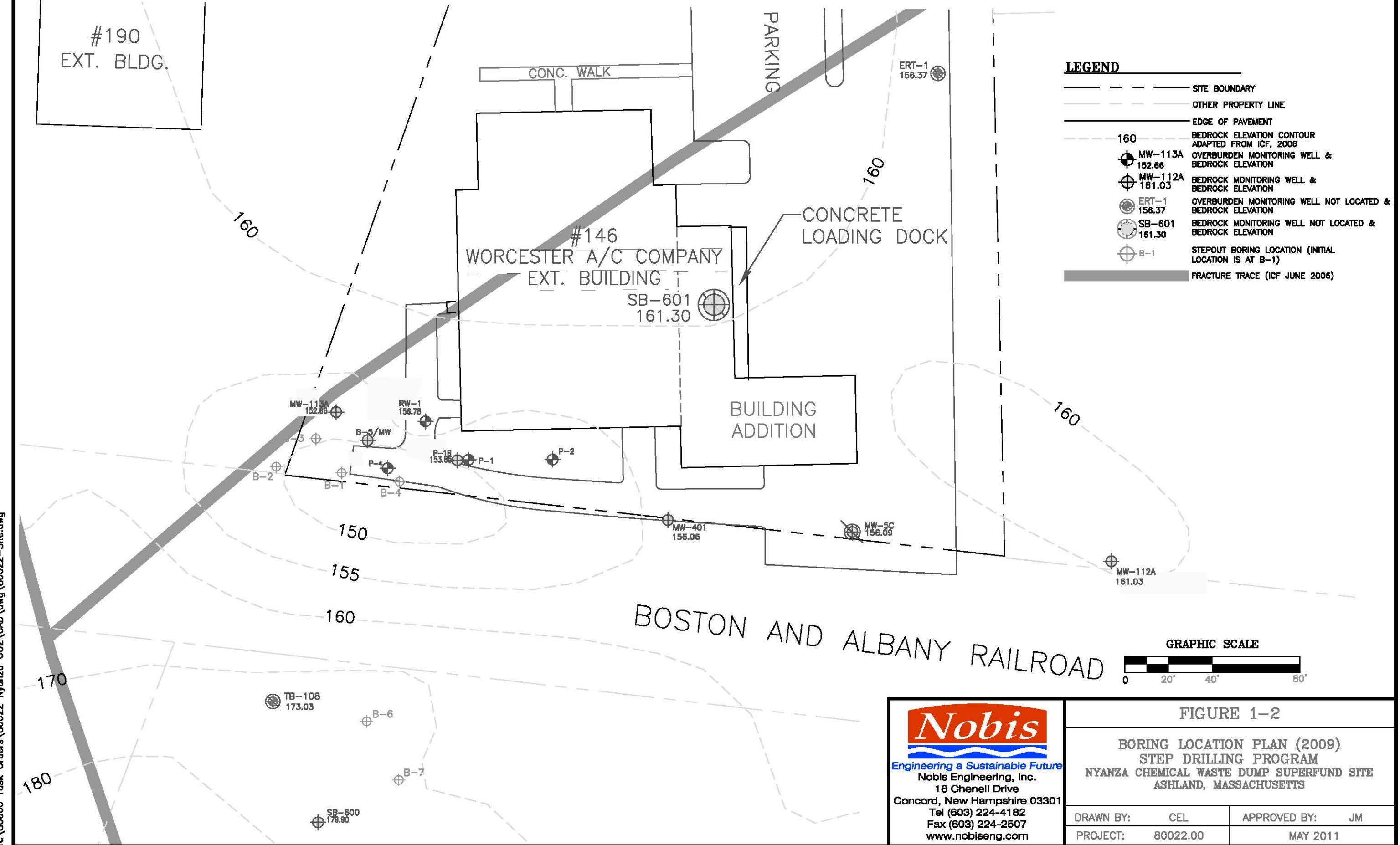
**FIGURE  
1-1**

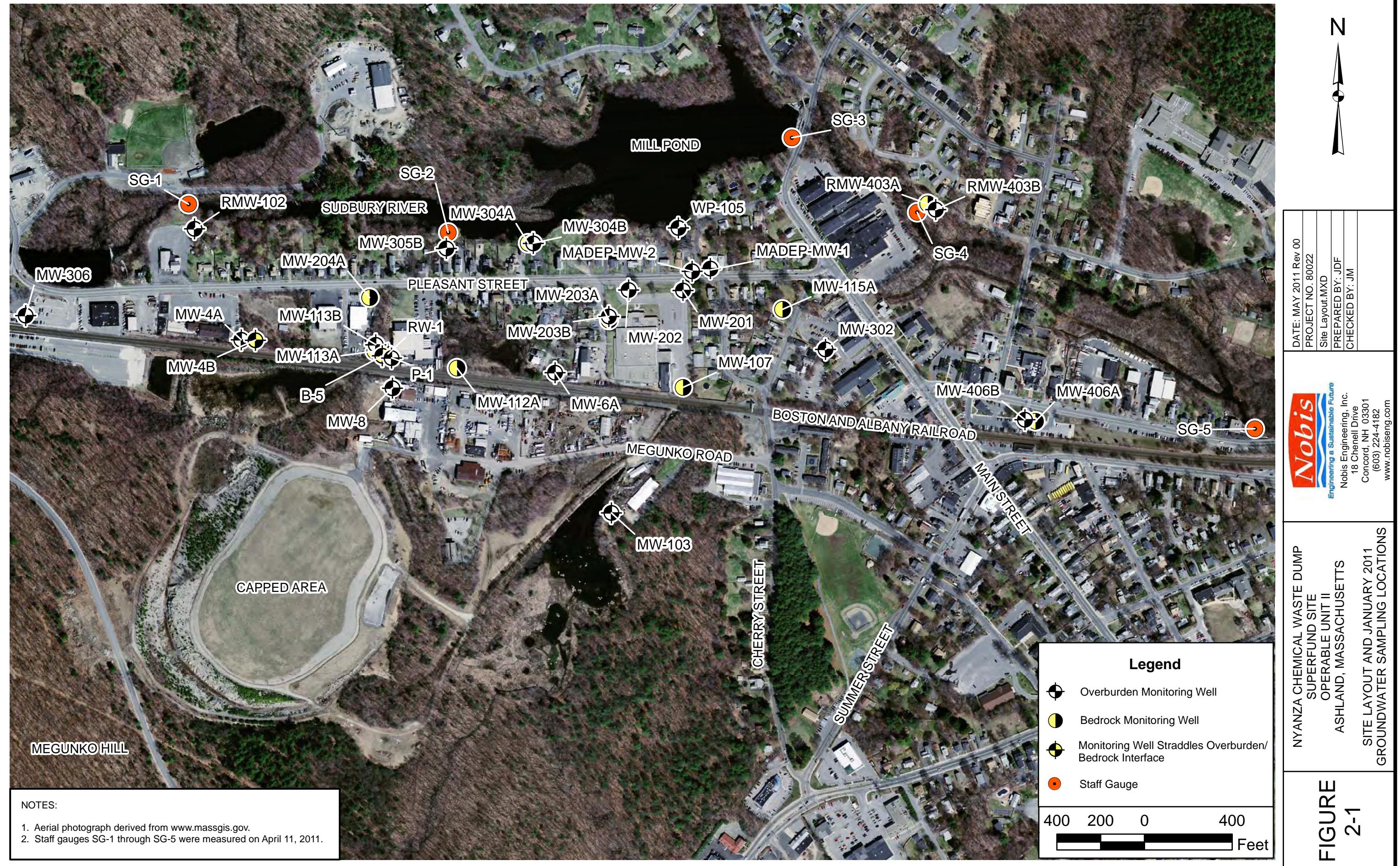
NYANZA CHEMICAL WASTE DUMP  
SUPERFUND SITE  
OPERABLE UNIT II  
ASHLAND, MASSACHUSETTS  
SITE LOCUS PLAN

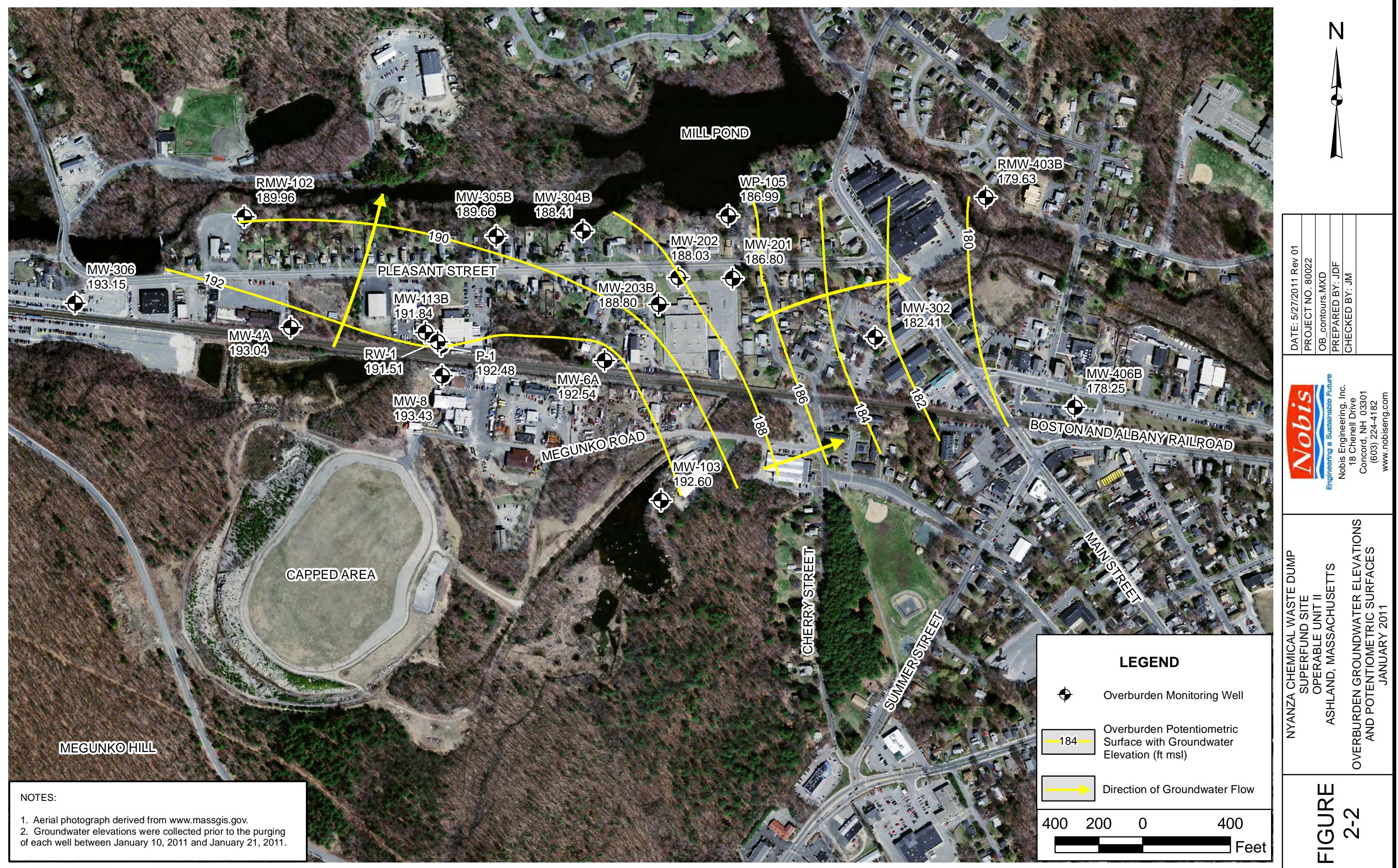


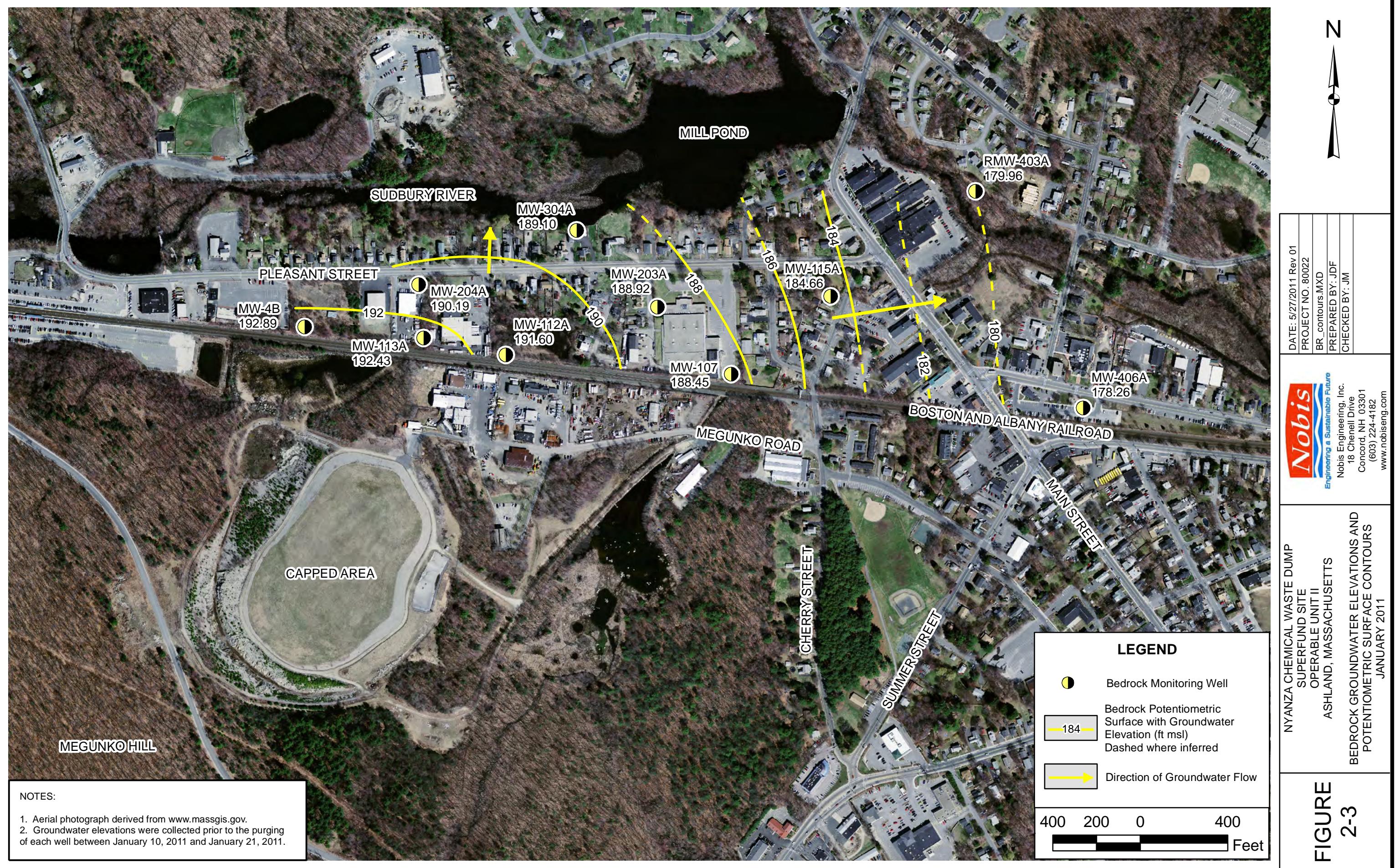
DATE: MAY 2011 REV 00
PROJECT NO. 80022
FILE NAME: Locus Plan.MXD
PREPARED BY: JDF
CHECKED BY: JM

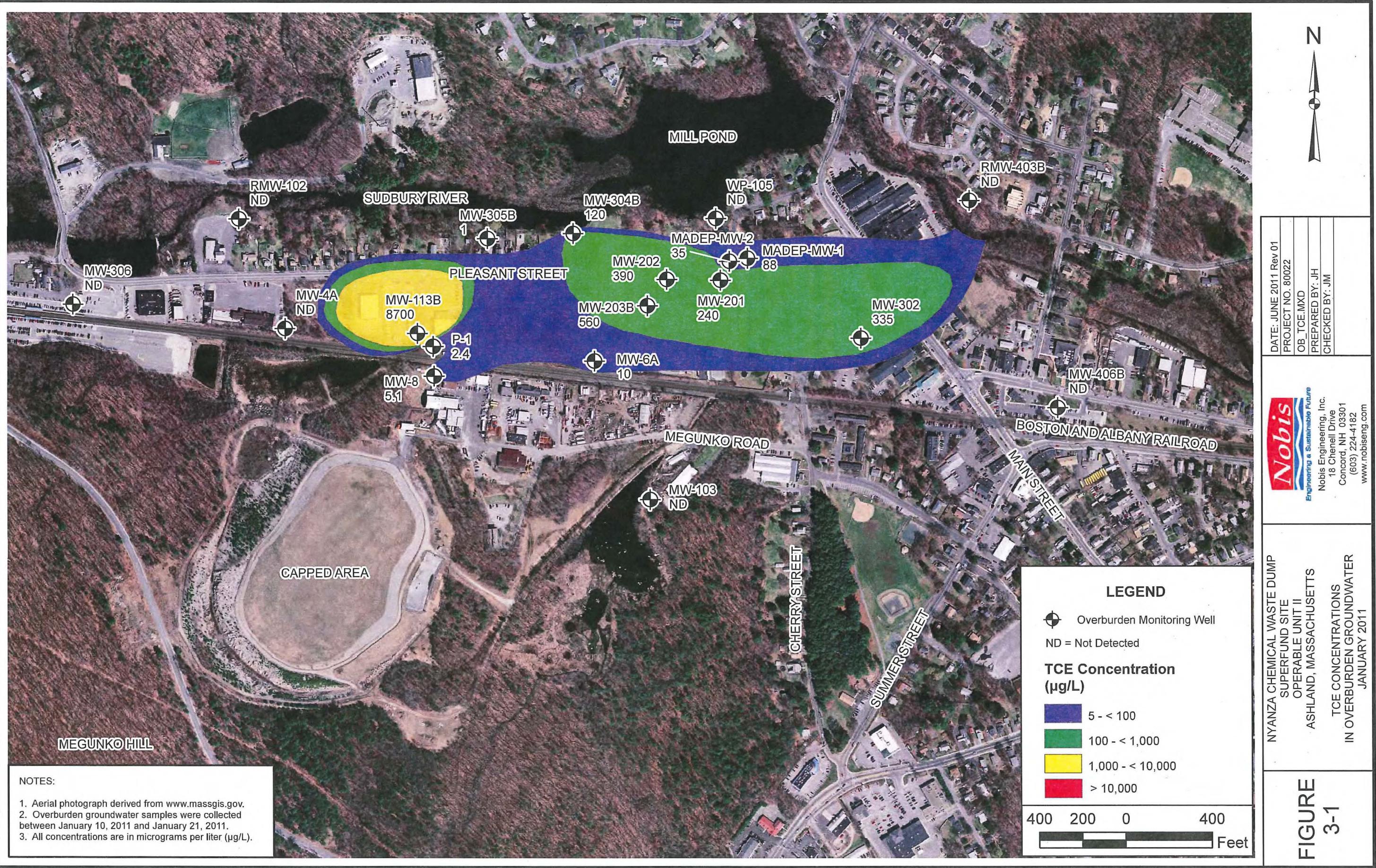


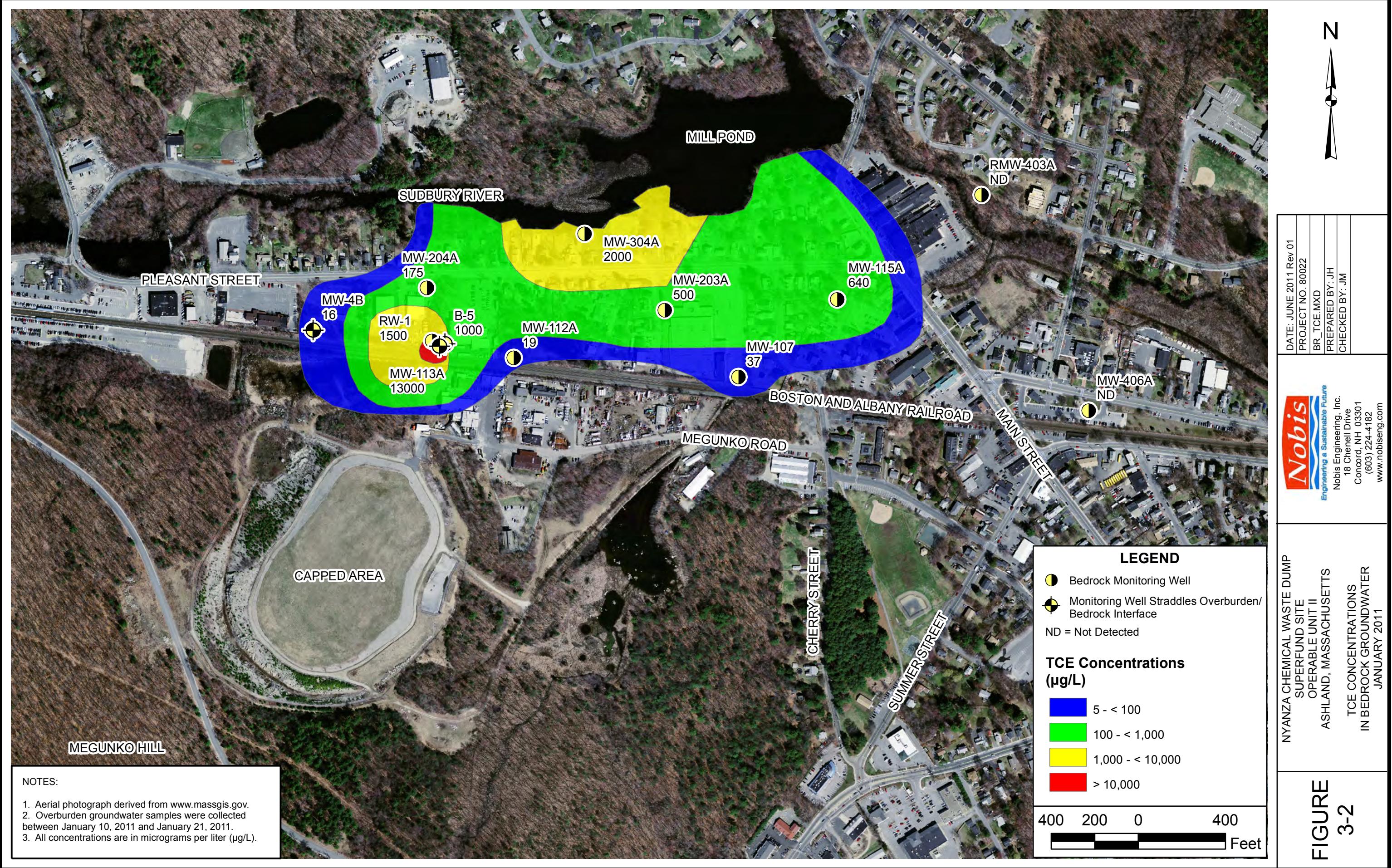


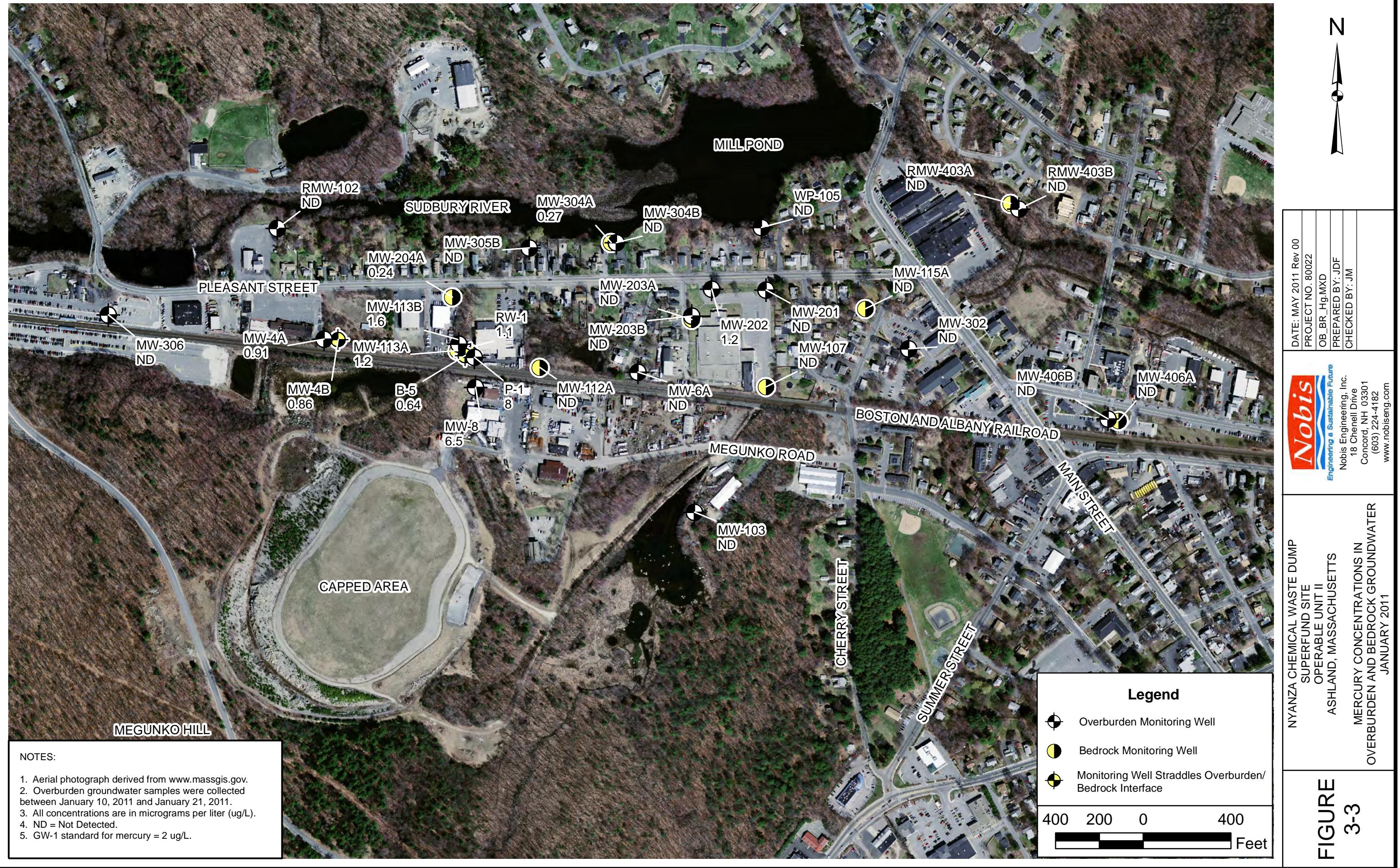


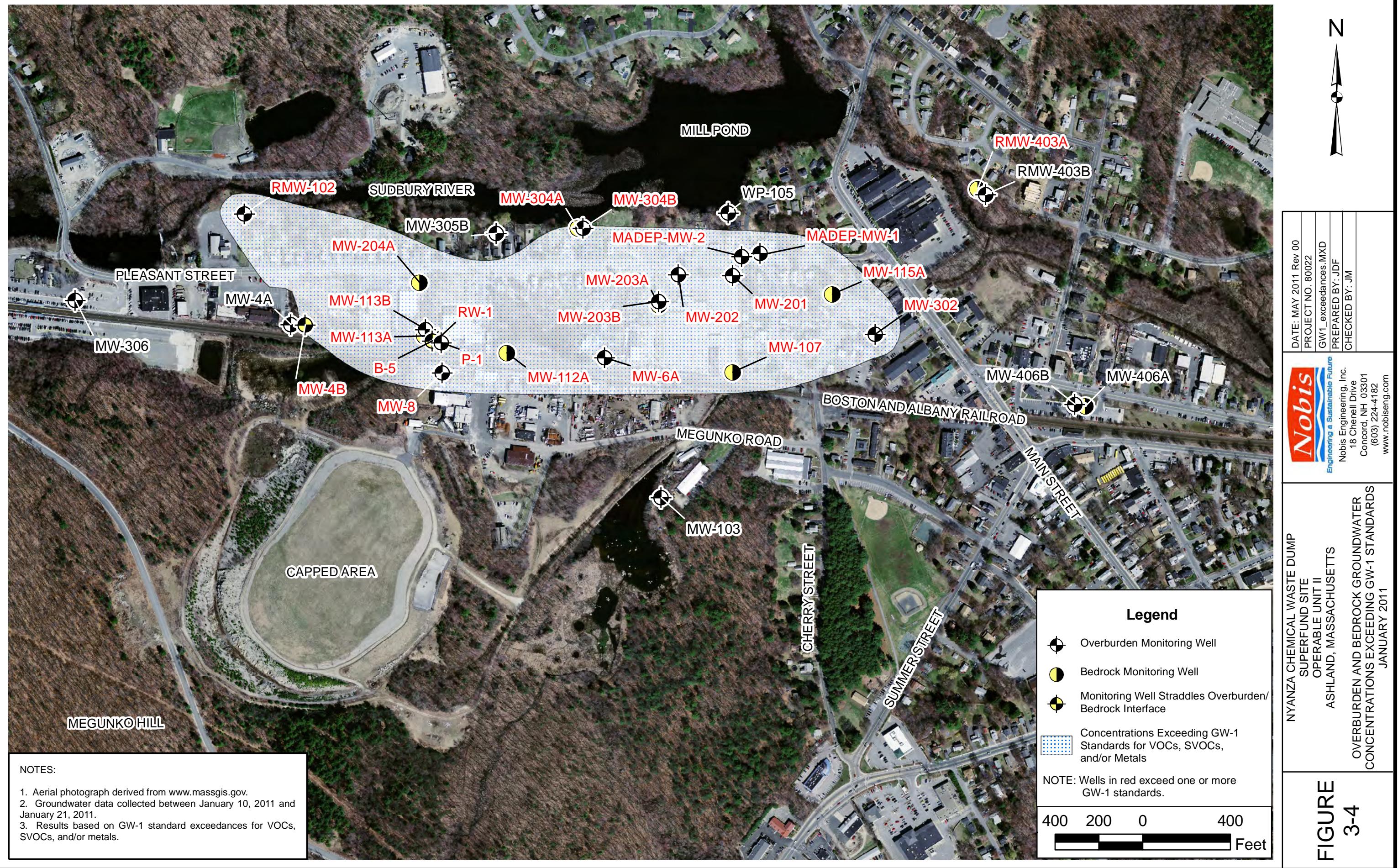


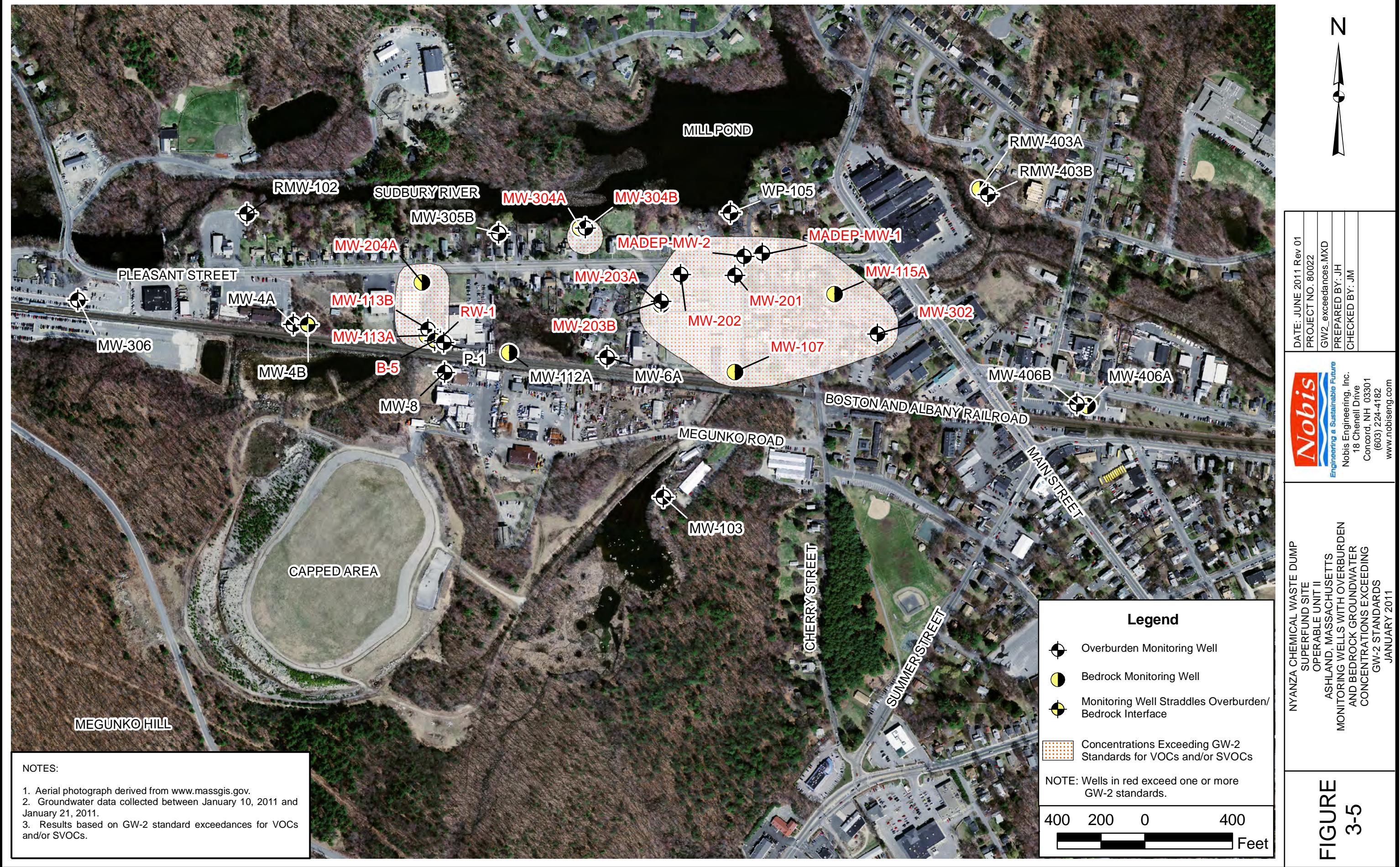


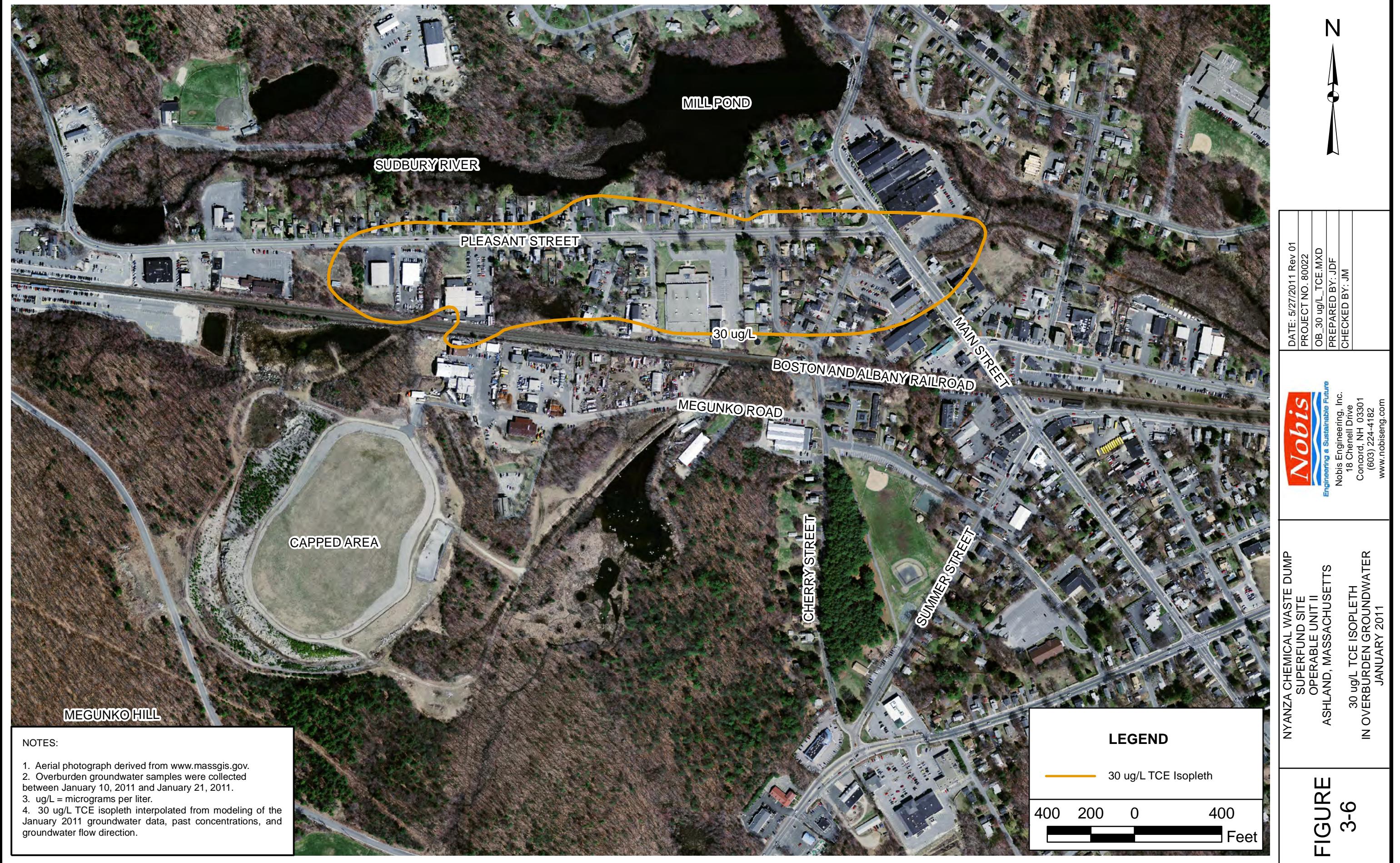












DATE: 5/27/2011 Rev 01
PROJECT NO. 80022
OB_30 ug/L_TCE.MXD
PREPARED BY: JDF
CHECKED BY: JM

**Nobis**  
Engineering & Sustainable Future  
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A**



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010

Attachment B, Page 1 of 1  
Rev.: 2

Date : 11/9/11 Page 1 of 1

Field Personnel KAfmitage

Well Depth as installed (ft.):

### Screen Length in ft.

Depth to GW (ft.):

Pump/Tubing Intake set (ft.):

### Screen Depth in ft.

From: SS

Sample Designation:

FROM \_\_\_\_\_

Sample Designation 11T

Sample Time 11:55

Pump Type (include pressure, discharge, and rate)

Multimeter model and serial number 1650MDS 791K0637AA Turbidity meter model and serial number LAMOTTE 20202 : ME K1420

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Notes. (Initial wellhead FID/FID reading, deviations from SCR, etc.)

$\frac{1}{2}$  O level meter probe will not fit down the well.

Digitized by srujanika@gmail.com

Cloudy Pm 10.75% P P P Cum. T Spec. H CDO DO /100% Turbidity

Notes: All depths in feet below top of PVC unless specified

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 11/11/11

Page 1 of 1

Well ID: MADEP-MW-2

Field Personnel: Karmiage

Purging Start Time: 0949

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.

Screen Depth in ft.

Parameter Stabilization: (Circle) Yes // No

Depth to GW (ft.):

From: 55

Two Hour Time Limit Reached? (Circle) Yes // No

Pump/Tubing Intake set (ft.):

From: 55

Total Volume Purged, Including Drawdown (gallons): 165~25

Sample Designation:

Time at Purge Completion: 1032

Sample Time: 1030

Signature:

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) peristaltic

Multimeter model and serial number Y51150MDS 99K0637AA Turbidity meter model and serial number La Motte 2020e: ME14429

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

NO DTW. Water Level meter probe did not fit down the well. 55 well is less than 1" diam.  
The well is slightly angled!

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if >5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
0950	NA	280	/	/	8.42	794	7.02	149.9	15.68	4.91		
0955		280	/	/	10.06	796	5.99	144.4	6.00	4.22		
1000		280	/	/	9.80	792	5.83	144.1	5.53	4.01		
1005		280	/	/	9.93	789	5.75	143.4	5.45	3.31		
1010		280	/	/	9.79	786	5.73	143.0	5.73	3.11		
1015		280	/	/	9.81	785	5.73	142.7	5.37	3.00		
1020		280	/	/	9.77	783	5.72	142.2	5.48	2.91		
1025		300	/	/	9.79	785	5.71	141.9	5.41	2.80		
1030		300										

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 1-18-11 Page 1 of 1

Field Personnel Ken Marks

Well Depth as installed (ft.): 24

Screen Length in ft. 20 Screen Depth in ft. 4-24

Depth to GW (ft.): 6.61 From: PVC

Pump/Tubing Intake set (ft.): From: PVC

Sample Designation MW-403A

Sample Time 1200

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder

Multimeter model and serial number YSI 6500 DS #08810377 Turbidity meter model and serial number La Motte 20200 # 12233

Notes: (initial wellhead PID/RID reading, deviations from SOP, etc.)

Well ID: MW-403A MW-04A

Purging Start Time: 1050

Measured Well Depth (ft.): 23.68

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 7

Time at Purge Completion: 1155

Signature: Ken Marks

Clock Time	Discharge / Refill / Pump Setting PSI=30	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
1100	5-10	300	6.68			9.52	69	6.43	148.1	4.19	2025	
1105						9.57	67	6.22	189.0	4.00	1246	
1110						9.54	67	6.08	148.2	4.09	1011	
1115						9.55	67	6.05	150.2	3.88	764	
1120						9.62	66	6.04	153.3	3.69	330	
1125						9.61	66	6.02	159.3	3.55	142	
1130						9.45	66	6.01	152.1	3.11	69.7	
1135						9.41	66	6.01	151.7	2.91	63.0	
1140						9.38	65	5.98	150.0	2.37	62.0	
1145						9.39	65	6.00	151.1	2.31	26.3	
1150	V	V	V			9.34	65	6.01	150.9	2.33	24.7	
1155	V	V	V			9.34	65	6.00	151.1	2.31	24.8	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.

DRAFT



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 4/9/10 Page 1 of 1  
 Field Personnel Say W.  
 Well Depth as installed (ft.): 68  
 Screen Length in ft. 20 Screen Depth in ft. 48-68  
 Depth to GW (ft.): 65 From: Top PVC  
 Pump/Tubing Intake set (ft.): 3' from bottom From: Top PVC  
 Sample Designation \_\_\_\_\_  
 Sample Time 12:20

Well ID : MD-4033 MW-04BPurging Start Time : 11:25Measured Well Depth (ft.): 65.87

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 4.0Time at Purge Completion: 12:45Signature: JW

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
11:25	5	90	66.5	—	—	22.7	555	6.6	703.5	0.71	65.4	
11:35						9.41	590	5.98	205.7	5.75	56.5	
11:40						9.46	591	5.97	207.8	5.51	43.2	
11:45						9.47	591	5.97	207.7	5.38	36.0	
11:50						9.36	598	5.97	211.9	5.30	31.5	
11:55						9.48	Cell	5.97	212.6	5.18	29.1	
12:00						9.41	636	5.92	214.7	5.22	25.8	
12:05						9.35	662	5.98	216.2	4.79	23.5	
12:10						9.37	670	5.98	216.8	4.74	21.8	
12:15				↓	↓	9.38	673	5.94	218.9	4.62	20.5	
												End 12:20

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 11/11/11 Page 1 of 8 Well ID: MW-06A  
 Field Personnel: Karmitage (See bottom) Jurging Start Time: 0927  
 Well Depth as installed (ft.): Measured Well Depth (ft.): 69.20  
 Screen Length in ft. Screen Depth in ft.  
 Depth to GW (ft.): 1.45 From: 55 Parameter Stabilization: (Circle) Yes / No  
 Pump/Tubing Intake set (ft.): 63.00 From: 55 Two Hour Time Limit Reached? (Circle) Yes / No  
 Sample Designation Total Volume Purged, Including Drawdown (gallons): 1.25  
 Sample Time: 1050 Time at Purge Completion: 1047  
 Signature: *[Signature]*  
 Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder: ~40psi; R/D = 10/5  
 Multimeter model and serial number YS1650mDS: T9K0637AA turbidity meter model and serial number LaMotte 2020e: MEL4429  
 Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)  
 No product observed. Grey cloudy purge H<sub>2</sub>O

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if >5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
0945	5 10	100	3.16	/	/	8.67	393	6.19	-6.1	3.61	809	
0950	5 10	120	3.21	0.05	0.05	8.86	399	6.15	-15.4	2.19	784	
0955	5 10	120	3.36	0.05	0.10	8.92	399	6.12	-15.7	1.65	781	
1000	5 10	120	3.40	0.04	0.14	9.07	400	6.11	-18.9	1.46	683	
1005	5 10	120	3.46	0.06	0.20	9.04	399	6.12	-24.1	1.24	168	
1010	5 10	115	3.51	0.05	0.25	9.25	400	6.14	-27.5	1.15	143	
1015	5 10	120	3.56	0.05	0.30	9.55	401	6.15	-31.3	1.06	120	
1020	5 10	120	3.57	0.01	0.31	9.70	401	6.15	-35.0	1.00	93.5	
1025	5 10	120	3.60	0.03	0.34	9.78	400	6.15	-39.1	0.99	50.4	
1030		120	3.62	0.02	0.36	9.91	402	6.15	-43.8	0.95	50.0	
1035		120	3.63	0.01	0.37	9.92	402	6.15	-46.1	0.93	51.8	
1040		120	3.63	Ø	0.37	9.84	401	6.15	-46.7	0.92	50.6	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading 1045 no 3.63 Ø 0.37 9.87 401 6.15 -46.7 0.92 50.6

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 1-19-11

Page 1 of 1

Well ID : MW - 8

Field Personnel Ken Marks

Purging Start Time : 1010

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.

Screen Depth in ft.

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.): 5.11

From:

Two Hour Time Limit Reached ? (Circle) Yes / No

Pump/Tubing Intake set (ft.):

From:

Total Volume Purged, Including Drawdown (gallons): 5

Sample Designation MW - 8

Time at Purge Completion: 1115

Sample Time: 1120

Signature: Ken Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder PSI = 10

Multimeter model and serial number YSI 650 NAD#808/0377 Turbidity meter model and serial number LALOTTO 2020 C# 12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting PSI = 10	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
1030	5 10	250	5.21	0.10	-	6.63	1299	6.18	-3.5	7.98	1017	Purge water silty dark brown		
1035		250	5.21	0.0	0.10	6.61	1322	6.09	4.9	7.02	121			
1036		250	5.21	0.0	0.10	6.67	1380	6.08	8.7	5.93	55.5	Purge water slightly cloudy light		
1035		250	5.21	0.0	0.10	6.68	1412	6.09	9.2	5.41	29.3	brown		
1046		250	5.21	0.0	0.10	6.70	1408	6.11	11.0	4.56	24.7			
1045		250	5.21	0.0	0.10	6.74	1412	6.12	12.4	3.80	20.1			
1050		250	5.21	0.0	0.10	6.73	1410	6.12	13.1	3.38	12.2			
1055		250	5.21	0.0	0.10	6.72	1405	6.13	13.6	3.03	10.9			
1100		250	5.21	0.0	0.10	6.70	1410	6.13	16.9	2.55	7.96	Purge water clear No odor		
1105		250	5.21	0.0	0.10	6.68	1411	6.13	16.4	2.11	6.37			
1110		250	5.21	0.0	0.10	6.68	1411	6.14	17.0	1.91	5.12			
1115		250	5.21	0.0	0.10	6.69	1412	6.14	16.8	1.89	4.30			

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 1-14-11

Page 1 of 2

Well ID: MW-103

Field Personnel Ken Marks

Purging Start Time: 0850

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.

Screen Depth in ft.

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.): 8.54

From:

Two Hour Time Limit Reached? (Circle) Yes / No

Pump/Tubing Intake set (ft.): 16.50

From:

Total Volume Purged, Including Drawdown (gallons): 0

Sample Designation

Time at Purge Completion: 1045

Sample Time 1050

Signature: Ken Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder PSI = 16

Multimeter model and serial number VSI 650 MISS 08B10377 Turbidity meter model and serial number LaMotte 2020 C# 12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting PSI = 16	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
0855	3 12	125	8.61	0.07	-	6.46	99	6.27	164.2	5.98	411	Purged water cloudy orange
0900		125	8.61	0.0	0.07	6.80	93	5.92	168.7	4.32	312	
0905		125	8.61	0.0	0.07	6.91	89	5.51	177.8	2.72	242	
0910		125	8.61	0.0	0.07	7.21	89	5.46	187.7	3.10	219	
0915		125	8.61	0.0	0.07	7.53	89	5.46	185.0	1.93	191	
0920		125	8.61	0.0	0.07	7.75	89	5.47	183.7	1.72	125	
0925		125	8.61	0.0	0.07	7.83	89	5.47	182.1	1.60	175	
0930		125	8.61	0.0	0.07	7.89	89	5.47	178.6	1.53	167	
0935		125	8.61	0.0	0.07	7.93	90	5.48	173.5	1.44	158	
0940		125	8.61	0.0	0.07	8.11	90	5.48	172.2	1.36	150	
0945	✓	125	8.61	0.0	0.07	8.31	91	5.49	171.7	1.32	149	
0950	✓	125	8.61	0.0	0.07	8.36	91	5.51	165.6	1.29	124	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Approved by: M. Summerlin

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Well ID : MW-103

Field Personnel Ken Marcus

Purging Start Time :

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft. \_\_\_\_\_

Screen Depth in ft. \_\_\_\_\_

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Two Hour Time Limit Reached ? (Circle) Yes / No

Pump/Tubing Intake set (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_

Sample Designation \_\_\_\_\_

Time at Purge Completion:

Sample Time \_\_\_\_\_

Signature: Ken Marcus

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) \_\_\_\_\_

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

INFO See page #1

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if >5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
0955		125	8.61	0.0	0.07	8.31	91	5.52	160.0	1.39	116	Page #2 of 2
1000		125	8.61	0.0	0.07	8.26	91	5.53	157.9	1.35	100	Purge water slightly cloudy orange
1005		125	8.61	0.0	0.07	8.36	91	5.53	156.2	1.30	81.6	
1010		125	8.61	0.0	0.07	8.44	91	5.53	155.4	1.27	62.2	
1015		125	8.61	0.0	0.07	8.47	91	5.53	155.1	1.22	54.9	(10m) light orange purge water
1020		125	8.61	0.0	0.07	8.51	91	5.53	153.9	1.07	50.6	
1025		125	8.61	0.0	0.07	8.55	90	5.54	152.6	1.01	39.7	
1030		125	8.61	0.0	0.07	8.48	90	5.54	151.9	0.98	30.3	
1035		125	8.61	0.0	0.07	8.49	90	5.54	151.6	0.99	22.6	
1040		125	8.61	0.0	0.07	8.47	90	5.54	151.1	0.93	21.9	
1045		125	8.61	0.0	0.07	8.48	90	5.54	150.8	0.89	21.1	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Field Personnel K'Armistage

Well Depth as installed (ft.):

Screen Length in ft. Screen Depth in ft.

Depth to GW (ft.): 5.97 From: PVC

Pump/Tubing Intake set (ft.): 38.00 From: PVC

Sample Designation

Sample Time 1255 / 1320

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) peristaltic

Multimeter model and serial number Y51650MDS : 99K0637AA Turbidity meter model and serial number LaMotte 2020e : ME 14429

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID: MW-107 / DUP2

Purging Start Time: 1130

Measured Well Depth (ft.): 38.34

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 5 + 112 = 6.5

Time at Purge Completion: 1252

Signature: [Signature]

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
1140	NA	320	5.99	/	/	7.54	1590	5.85	171.3	17.15	11.9	initial purging H <sub>2</sub> O dark b -own		
1145		320	5.99	Ø	Ø	8.05	1632	5.87	159.5	15.55	9.93	Ø silty.		
1150		320	5.99	Ø	Ø	7.97	1622	5.85	152.0	14.22	14.4	A lot of Ø flock present		
1155		320	5.99	Ø	Ø	8.12	1629	5.85	144.4	13.19	56.4			
1200		350	5.99	Ø	Ø	8.30	1630	5.85	138.5	12.01	54.1			
1205		340	5.99	Ø	Ø	8.61	1649	5.84	131.3	10.52	24.0			
1210		340	5.99	Ø	Ø	8.31	1639	5.84	125.1	9.75	41.0			
1215		340	5.99	Ø	Ø	8.49	1639	5.84	119.9	8.00	8.09			
1220		340	5.99	Ø	Ø	8.56	1651	5.84	115.5	7.51	8.72			
1225		340	5.99	Ø	Ø	8.64	1638	5.83	111.6	2.62	7.65			
1230		340	5.99	Ø	Ø	8.74	1645	5.82	107.8	1.60	7.41			
1235		340	5.99	Ø	Ø	8.58	1629	5.82	104.4	1.19	7.74			

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.





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## Low-Flow Field Log

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Approved by: M. Summerlin

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Field Personnel Ken Marks

Well Depth as installed (ft): 43

Screen Length in ft. 5 Screen Depth in ft. 38-43

Depth to GW (ft.): 6.68 From: TPVC

Pump/Tubing Intake set (ft.): 42.4 From: TPVC

Sample Designation MW-112A

Sample Time 1110

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder

Multimeter model and serial number SI 650 MDS #DBB16377 Turbidity meter model and serial number LaNette 2020 C # 12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID: MW-112A

Purging Start Time: 0935

Measured Well Depth (ft.): 47.41

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 4

Time at Purge Completion: 1100

Signature: Ken Marks

Clock Time	Discharge / Refill / Pump Setting PSI=72	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
0945	4 11	100	7.12	0.44	-	10.35	1836	6.65	-56.7	4.14	50.9	Purge water slightly cloudy
0950		100	7.27	0.15	0.59	9.98	1715	6.74	-61.0	2.21	40.4	very light brown
0955		100	7.50	0.23	0.82	9.63	1449	6.86	-66.2	1.71	25.2	
1000		100	7.72	0.22	1.04	9.68	1368	6.90	-66.4	1.02	27.9	
1005		100	7.90	0.18	1.22	9.68	1320	6.90	-65.8	0.81	34.6	
1010		100	8.20	0.30	1.52	9.74	1259	6.92	-62.9	0.73	31.8	
1015		100	8.57	0.37	1.89	8.71	1273	6.92	-58.6	0.69	26.6	
1020		100	8.73	0.16	2.05	7.66	1288	6.93	-54.2	0.63	21.6	
1025		100	8.89	0.16	2.21	8.00	1284	6.86	-50.8	0.68	25.1	
1030		100	9.11	0.22	2.43	7.81	1311	6.90	-48.1	0.66	26.9	
1035		100	9.30	0.19	2.62	8.31	1322	6.97	-43.4	0.51	26.1	
1040		100	9.55	0.25	2.87	8.40	1340	6.97	-42.5	0.44	25.7	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.





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## Low-Flow Field Log

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Rev.: 2

Prepared by: S. Bonis

Approved by: M. Summerlin

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Well ID: 113A

Field Personnel: Jay

Purging Start Time: 13:40

Well Depth as installed (ft.): 51

Measured Well Depth (ft.): 53.81

Screen Length in ft. 5

Screen Depth in ft. 46.51

Depth to GW (ft.): 3.26

From: 113A stainless

Pump/Tubing Intake set (ft.): 3' From B.D.

From:

Sample Designation: 14:40

Sample Time: MW-113A

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 2.0

Time at Purge Completion: 3:10

Signature:

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

113A stainless

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm							
13:50		120	3.46	—	—	75.4	1031	6.33	115.1	4.20	66.9			
13:55		120	3.46	—	—	77.7	800	6.38	117.5	3.08	46.1			
14:00		120	3.46	—	—	8.19	1151	6.38	126.9	2.38	36.0			
14:05		120	3.46	—	—	8.42	906	6.31	136.9	1.61	29.5			
14:10		120	3.46	—	—	8.67	617	6.13	154.5	1.12	27.5			
14:15		120	3.46	—	—	8.85	476	6.04	166.1	0.95	25.1			
14:20		120	3.46	—	—	8.94	397	5.99	180.3	0.96	9.94			
14:25		120	3.46	—	—	8.82	378	5.77	187.6	0.85	14.6	12.7		
14:30		120	3.46	—	—	8.83	372	5.77	190.3	0.85	12.6			
14:35		120	3.46	—	—	8.86	371	5.77	190.9	0.86	12.0			
														Sample Time 14:40

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.

- Black Water Probe Problem Notes on Pump During Retrieval, Gauge 13' bottom w/ Interface type
- Interface probe Incident Probe @ 53.00' → 53.80'
- Infrared corey Gage cal/Corry



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Well ID : MW-113B

Field Personnel Karmi tage

Purging Start Time : 1335

Well Depth as installed (ft.): 21.50

Measured Well Depth (ft.): 46.24

Screen Length in ft.

Screen Depth in ft. 24.5 - 21.50

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.): 34.90 3.49

From: PVC

Two Hour Time Limit Reached ? (Circle) Yes / No

Pump/Tubing Intake set (ft.): 73.20

From: PVC

Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_

Sample Designation

Time at Purge Completion:

Sample Time 1520

Signature: Karmi tage

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

bladder: p ~ 40psi ; R/D = 10/5

Multimeter model and serial number Y51650MDS 97K0637AF

Turbidity meter model and serial number LaMotte 2020e : ME14476

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

strong odor to purge H<sub>2</sub>O. No product observed.

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm							
1345	5 10	300	3.56	0	0	9.72	854	6.25	25.7	6.76	183	purge H <sub>2</sub> O is cloudy, grey		
1350	5 10	300	3.56	0	0	9.79	779	6.21	32.7	6.73	154			
1355	5 10	300	3.56	0	0	9.79	754	6.20	37.0	6.47	73.1			
1400	5 10	300	3.56	0	0	9.79	735	6.20	40.9	6.20	68.5			
1405	5 10	300	3.56	0	0									
1410														
1415	5 10	300	3.64			9.74	687	6.19	56.5	6.35	45.8			
1420	5 10	300	3.65			9.69	684	6.19	57.4	6.47	40.4			
1425	5 10	300	3.65			9.77	680	6.19	58.5	6.81	23.5			
1430	5 10	300	3.65			9.80	683	6.19	58.9	6.75	21.7			
1435	5 10	300	3.65			9.76	679	6.19	60.0	6.61	27.3			
1440	5 10	300	3.65			9.76	673	6.19	61.2	6.65	18.7			
1445	5 10	300	3.65											
1450	5 10	300	3.65											
1455	5 10	300	3.65											
1500	5 10	300	3.65											

Notes: All depths in feet below top of PVC unless specified.

NR= No Reading

Use the back of the log to record additional observations and descriptions.



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Field Personnel Karmi Tagge

Well Depth as installed (ft.): \_\_\_\_\_

Screen Length in ft. \_\_\_\_\_

Screen Depth in ft. \_\_\_\_\_

Depth to GW (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Pump/Tubing Intake set (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Sample Designation \_\_\_\_\_

Sample Time 1520

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) \_\_\_\_\_

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID : MW - 113B

Purging Start Time : \_\_\_\_\_

Measured Well Depth (ft.): \_\_\_\_\_

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached ? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_

Time at Purge Completion: \_\_\_\_\_

Signature: \_\_\_\_\_

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm							
1505	5 10	300	3.65	Ø	Ø	9.78	671	6.19	62.3	6.75	18.1			
1510	5 10	300	3.65	Ø	Ø	9.79	670	6.19	63.8	6.77	20.0	17.9	NTU.	
1515	5 10	300	3.65	Ø	Ø	9.71	671	6.19	63.7	6.73	18.0			
1520	5 10	Sample collected												

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Field Personnel K Armistage

Well Depth as installed (ft.):

Screen Length in ft.

Screen Depth in ft.

Depth to GW (ft.): 7.96

From: PVC

Pump/Tubing Intake set (ft.): ~ 20

From: PVC

Sample Designation

Sample Time 1330

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) peristaltic pump.

Multimeter model and serial number YSI 650MDS: 99K0637AA Turbidity meter model and serial number LaMotte 2020e: ME 14476

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

bladder pump would not go down the well after ~ 2 ft.  
MW-115B: Dry - TD = 5.20 below pvc.

Well ID : MW-115A

Purging Start Time : 1204

Measured Well Depth (ft.): 45.88

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached ? (Circle) Yes No

Total Volume Purged, Including Drawdown (gallons): 1328 Kdn/gall.

Time at Purge Completion: ~ 1328

Signature: K. Armistage

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
1210	NA	120	9.10	—	—	9.99	3684	3.03	460.7	5.91	26.1	
1215		100	9.37	0.27	0.27	10.07	3724	3.03	492.5	5.89	23.6	
1220		100	9.71	0.34	0.61	10.32	3767	3.02	506.7	5.85	23.1	
1225		95	10.00	0.29	0.90	10.40	3774	3.02	511.0	5.90	22.4	
1230		96	10.18	0.18	01.08	10.42	3782	3.02	512.1	5.89	20.7	
1235		96	10.08	-0.10	0.98	10.25	3778	3.01	516.8	5.82	13.8	
1240		98	10.08	Ø	0.98	10.03	3781	3.00	518.6	5.83	12.0	
1245		98	10.01	-0.07	0.91	9.89	3773	3.00	517.6	5.83	10.1	
1250		98	10.01	Ø	0.91	9.79	3751	3.00	519.0	5.80	9.19	
1255		98	10.00	-0.01	0.90	9.87	3759	3.00	521.5	5.75	9.10	
1300		98	10.04	0.04	0.94	9.90	3763	3.00	520.1	5.60	5.71	
1305	✓	98	10.01	-0.03	0.91	9.92	3773	3.01	519.0	5.65	4.67	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Field Personnel K. Armistead

Well Depth as installed (ft.): \_\_\_\_\_

Screen Length in ft. \_\_\_\_\_

Screen Depth in ft. \_\_\_\_\_

Depth to GW (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Pump/Tubing Intake set (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Sample Designation \_\_\_\_\_

Sample Time 1330

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) \_\_\_\_\_

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID : MW - 115A

Purging Start Time : \_\_\_\_\_

Measured Well Depth (ft.): \_\_\_\_\_

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_

Time at Purge Completion: \_\_\_\_\_

Signature:

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if > 0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm					
1310	NA NA	98	10.00	-0.01	0.90	10.14	3780	3.01	5.60	517.8	4.90	
1315		98	10.00	∅	0.90	10.31	3791	3.01	5.54	519.1	3.46	
1320		98	10.04	0.04	0.94	10.21	3802	3.01	5.53	516.8	3.15	✓
1325		100	10.03	-0.01	0.93	10.30	3808	3.02	5.55	515.1	2.95	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Prepared by: S. Bonis

Approved by: M. Summerlin

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Field Personnel Jay D.

Well Depth as installed (ft.): 20.0

Screen Length in ft. 5 Screen Depth in ft. 15-20

Depth to GW (ft.): 13.41 From: PVC

Pump/Tubing Intake set (ft.): 5 from 13.41 From: —

Sample Designation MW-107-201

Sample Time 13:35

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder

Multimeter model and serial number VST 0403884AB Turbidity meter model and serial number LaMotte 2020-14432

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.) Bladder

Very Rusty Water

Well ID: MW-107-201

Purging Start Time: 12:30

Measured Well Depth (ft.): 22.67

Parameter Stabilization: (Circle) Yes  NoTwo Hour Time Limit Reached? (Circle) Yes  No

Total Volume Purged, Including Drawdown (gallons): 60

Time at Purge Completion: 1:35

Signature: JWD

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if >5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm							
12:35	10	5	280	13.65	—	13.19	2713	6.01	53.1	1.99	316	24 PSI		
12:40	10	5	280	13.24	—	13.24	2699	5.96	61.0	1.60	307			
12:45	10	5	280	13.05	—	13.31	2673	5.76	61.0	0.73	255			
12:50	10	5	280	13.65	—	13.44	2654	5.76	65.4	0.77	221			
12:55	10	5	280	13.65	—	13.41	2605	5.75	65.0	0.64	157			
13:00	10	5	280	13.65	—	13.43	2575	5.75	64.0	0.51	157			
13:05	10	5	280	13.65	—	13.52	2545	5.75	64.0	0.50	66.1			
13:10	10	5	280	13.65	—	13.54	2518	5.74	63.8	0.47	46.3			
13:15	10	5	280	13.65	—	13.55	2451	5.73	63.8	0.34	34.7			
13:20	10	5	280	13.65	—	13.55	2392	5.73	66.2	0.31	27.5			
13:25	10	5	280	13.65	—	13.55	2381	5.73	66.5	0.31	28.5			
13:30	10	5	280	13.65	—	13.56	2377	5.73	66.7	0.33	27.9	Sample Time 13:35		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.

JWD



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## Low-Flow Field Log

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Approved by: M. Summerlin

Date: 1/10/11

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Field Personnel K.Armistage

Well Depth as installed (ft.): 85

Screen Length in ft. 5

Screen Depth in ft. 30-35

Depth to GW (ft.): 10.57

From: PVC std pipe

Pump/Tubing Intake set (ft.): 25.00

From: PVC std pipe

Sample Designation MW-202-011111

Sample Time 1255 / 1330

Well ID: MW-202/DWPI

Purging Start Time: 1130

Measured Well Depth (ft.): 28.08

Parameter Stabilization: (Circle) Yes No

Two Hour Time Limit Reached? (Circle) Yes No

Total Volume Purged, Including Drawdown (gallons): 2.25

Time at Purge Completion: 1420

Signature: K.Armistage

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) bladder: p=25 psi; R/D = 10/5

Multimeter model and serial number YSI650MDS: 99K0637AA Turbidity meter model and serial number La Motte 2030R: ME-14476

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

No product present.

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm							
1135	5	10	100	10.81	—	10.02	2,464	5.67	117.9	7.11	169		Water color is brown,	
1140	5	10	100	10.78	-0.02	-0.02	9.85	2447	5.64	116.4	7.37	165	flock settling out in bucket	
1145	5	10	100	10.77	-0.01	-0.03	10.01	2,453	5.61	121.8	7.44	150		
1150	5	10	100	10.78	0.01	-0.02	10.07	2,466	5.55	129.2	7.46	105.8		
1155	5	10	100	10.78	—	-0.02	9.61	2433	5.55	137.9	7.67	98.6		
1200	5	10	100	10.78	—	-0.02	9.49	2418	5.53	142.9	7.73	83.2		
1205	5	10	100	10.78	—	-0.02	10.29	2462	5.52	147.9	7.73	71.1		
1210	5	10	100	10.78	—	-0.02	10.56	2475	5.51	149.5	7.78	69.0		
1215	5	10	100	10.78	—	-0.02	10.54	2470	5.50	151.4	7.74	68.0		
1220	5	10	100	10.78	—	-0.02	10.84	2478	5.51	154.4	7.70	65.1		
1225	5	10	100	10.78	—	-0.02	10.95	2484	5.48	157.2	7.64	61.6		
1230	5	10	100	10.78	—	-0.02	10.90	2,478	5.47	158.7	7.71	55.8		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

1235 100 10.78 — -0.02 10.81 2,463 5.45 1500 7.75 56 Turbidity = 55.2 NTU

(20)

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Well ID: MW-202/Dup 1

Field Personnel: K. Armistage

Purging Start Time:

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft. \_\_\_\_\_

Screen Depth in ft. \_\_\_\_\_

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Two Hour Time Limit Reached? (Circle) Yes / No

Pump/Tubing Intake set (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_

Sample Designation \_\_\_\_\_

Time at Purge Completion: \_\_\_\_\_

Sample Time 1255/1330

Signature: \_\_\_\_\_

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) \_\_\_\_\_

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

See  
Pg 1

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if > 0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec / min setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
1240	5 10	100	10.78	0	-0.02	10.76	2457	5.46	1626	7.83	55.0	
1245	5 10	100	10.78	0	-0.02	10.85	2460	5.46	163.3	7.82	53.8	
1250	5 10	100	10.78	0	-0.02	10.88	2458	5.47	162.8	7.82	53.0	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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Field Personnel Ken Marks

Well Depth as installed (ft.): 78.7

Screen Length in ft. 5 Screen Depth in ft. 78.7

Depth to GW (ft.): 5.54 From: 55

Pump/Tubing Intake set (ft.): 73.49 From: 55

Sample Designation MW-203A-01111

Sample Time 1350

Well ID : MW - 203 A

Purging Start Time : 1140

Measured Well Depth (ft.): 78.49

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 3.5

Time at Purge Completion: 1345

Signature: Ken Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder PST = 60

Multimeter model and serial number VSI 650 405#08B1013 Turbidity meter model and serial number LaMotte 2020 e #12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Page #1 of 2

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
1145	5	150	5.61	0.07	-	10.86	11973	7.45	-19.8	6.44	90.0	Purge slightly cloudy / light brown		
1150		150	5.60	0.05	0.12	11.11	11596	7.61	-19.5	2.86	66.5			
1155		150	5.67	0.01	0.13	10.77	16076	7.64	-28.7	1.89	52.9			
1200		150	5.67	0.0	0.13	10.76	15944	7.60	-23.3	1.01	46.7			
1205		150	5.69	0.02	0.15	9.96	15652	7.58	-22.63	0.63	41.6			
1210		150	5.70	0.01	0.16	9.85	21885	7.51	-22.83	0.48	36.7			
1215		150	5.71	0.01	0.17	10.09	21812	7.51	-23.18	0.39	32.9			
1220		150	5.71	0.0	0.17	10.01	22027	7.38	-23.5	0.22	29.3			
1225		150	5.72	0.01	0.18	9.87	21906	7.42	-21.1	0.21	26.6			
1230		150	5.72	0.0	0.18	10.15	21356	7.57	-30.5	0.21	20.6			
1235		150	5.72	0.0	0.18	10.50	20111	7.49	-30.7	0.21	16.0			
1240		150	5.73	0.01	0.19	10.61	20016	7.46	-30.83	0.20	10.36	Purge water slightly yellowish		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Approved by: M. Summerlin

Date: 1-10-11

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Well ID: MW-203A

Field Personnel Koen Marks

Purging Start Time: 1140

Well Depth as installed (ft.): 78.7

Measured Well Depth (ft.): 78.49

Screen Length in ft. 5 Screen Depth in ft. \_\_\_\_\_

Parameter Stabilization: (Circle) Yes  No

Depth to GW (ft.): 5.54

From: \_\_\_\_\_

Two Hour Time Limit Reached? (Circle) Yes / No

Pump/Tubing Intake set (ft.): 73.49

From: \_\_\_\_\_

Total Volume Purged, Including Drawdown (gallons): 315

Sample Designation MW-203A-01111

Time at Purge Completion: 1345

Sample Time 1350

Signature: Koen Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

## Well info on page # 1

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
1245		150	5.73	0.0	0.19	10.56	19497	7.42	-302.6	0.20	9.79	Page # 2 of 2		
1250		150	5.74	0.01	0.20	10.43	19152	7.37	-298.4	0.20	9.02	Purge water slightly yellowish		
1255		150	5.74	0.0	0.20	10.13	18926	7.30	-286.7	0.20	9.59			
1300		150	5.74	0.0	0.20	9.93	18581	7.27	-256.9	0.20	9.63			
1305		150	5.74	0.0	0.20	9.98	18558	7.25	-248.6	0.20	9.33			
1310		150	5.74	0.0	0.20	9.90	17119	7.33	-255.6	0.21	9.21			
1315		150	5.74	0.0	0.20	9.95	15311	7.34	-257.7	0.21	8.16			
1325		150	5.74	0.0	0.20	10.02	14910	7.40	-293.4	0.21	7.97			
1330		150	5.74	0.0	0.20	10.25	14101	7.41	-292.8	0.22	7.71			
1335		150	5.75	0.01	0.21	10.28	13793	7.42	-303.7	0.22	7.67			
1340		150	5.75	0.0	0.21	10.31	13787	7.41	-295.9	0.23	7.61			
1345	V	150	5.75	0.0	0.21	10.38	13779	7.41	-297.0	0.23	7.57			

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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Approved by: M. Summerlin

Date: 1-11-11 Page 1 of 1

Field Personnel Ken Marks

Well Depth as installed (ft.):

Screen Length in ft. Screen Depth in ft.

Depth to GW (ft.): 5.57 From:

Pump/Tubing Intake set (ft.): 26.91 From:

Sample Designation MW-203B

Sample Time 1045

Well ID: MW-203B

Purging Start Time: 0935

Measured Well Depth (ft.):

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 1.5

Time at Purge Completion: 1040

Signature: Ken Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder PSI = 19

Multimeter model and serial number YSI650MAS #08R10377 Turbidity meter model and serial number Lytette 2020 C # 12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting PSI=19	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
0945	7.5	100	5.78	0.21	-	8.78	1672	6.23	+3.5	3.04	89.1	Purge water silty dark brownish		
0950		100	5.81	0.03	0.24	8.11	1640	6.22	+3.0	83.06	80.1	dark orangeish. Slight odor?		
0955		100	5.83	0.62	0.26	7.84	1621	6.21	+2.7	3.03	76.9			
1000		100	5.84	0.01	0.27	8.15	1618	6.22	+3.4	2.56	82.5			
1005		100	5.84	0.0	0.27	7.84	1610	6.23	+4.9	2.13	81.3			
1010		100	5.84	0.0	0.27	8.13	1621	6.24	+5.9	1.92	80.7			
1015		100	5.85	0.01	0.28	7.59	1601	6.25	+5.6	1.07	81.3			
1020		100	5.85	0.0	0.28	7.15	1580	6.26	+5.8	1.01	80.7			
1025		100	5.86	0.01	0.29	6.80	1542	6.26	+5.3	0.98	84.1			
1030		100	5.86	0.00	0.29	6.21	1535	6.27	+5.1	0.99	81.9			
1035	V	100	5.87	0.01	0.30	6.33	1541	6.28	+5.4	0.81	82.1	V		
1040	V	100	5.87	0.0	0.30	6.37	1546	6.28	+5.5	0.80	81.7	V		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2

Prepared by: S. Bonis

Approved by: M. Summerlin

Date: 1/14/11

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Well ID: MW-204A

Field Personnel K.Armstrong

Purging Start Time: 0901

Well Depth as installed (ft.):

Measured Well Depth (ft.): 47.45

Screen Length in ft.

Screen Depth in ft.

Depth to GW (ft.): 8.41

From: 55/2"

Pump/Tubing Intake set (ft.): ~15

From: 55

Sample Designation:

Sample Time 1030

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) peristaltic

Multimeter model and serial number YS1650MDS:99K Turbidity meter model and serial number LaMotte 2020c ME14476

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

well kinked &amp; photographed: peristaltic pump used

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): ~ 1 gallon

Time at Purge Completion: 1037

Signature: [Signature]

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
0905	NA	105	9.15	—	—	7.37	298	4.16	256	4.91	191	orange-brown purge H <sub>2</sub> O
0910		100	9.22	0.07	0.07	5.63	245	4.01	300	4.81	143	
0915		100	9.38	0.16	0.23	5.83	239	4.04	343	4.51	96.5	
0920		100	9.39	0.01	0.24	5.42	236	4.06	351.5	4.50	94.2	
0925		100	9.51	0.12	0.36	6.99	239	4.21	326.9	4.22	90.1	
0930		100	9.58	0.07	0.43	7.33	245	4.36	317.7	4.07	88.3	
0935		100	9.62	0.04	0.47	7.21	244	4.02	316.8	4.02	82.0	pH = 4.44
0940		100	9.64	0.02	0.49	6.71	237	4.41	308.5	4.02	80.5	
0945		100	9.59	-0.05	0.44	6.34	235	4.56	303.6	3.93	52.9	
0950		100	9.61	0.02	0.46	6.68	238	4.59	300.7	3.85	49.6	
0955		100	9.60	-0.01	0.45	7.24	241	4.65	289.8	3.76	51.2	
1000	NR	100	9.63	0.03	0.48	7.59	256	4.89	251.6	3.56	48.5	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Approved by: M. Summerlin

Date : 11/4/11

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Well ID : MW-204A

Field Personnel K.Armstrong

Purging Start Time :

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.

Screen Depth in ft.

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.):

From:

Two Hour Time Limit Reached? (Circle) Yes / No

Pump/Tubing Intake set (ft.):

From:

Total Volume Purged, Including Drawdown (gallons):

Sample Designation

Time at Purge Completion:

Sample Time 10:30

Signature:

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number

Turbidity meter model and serial number

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm					
1005	NA	100	9.65	0.02	0.50	7.66	263	5.08	231.7	3.33	52.4	
1010		100	9.68	0.03	0.53	7.95	269	5.16	222.0	3.21	48.9	
1015		100	9.66	-0.02	0.51	7.83	271	5.13	218.3	3.20	45.6	
1020		100	9.67	0.01	0.52	7.89	269	5.20	216.0	3.23	44.0	
1025		100	9.71	0.04	0.56	7.86	268	5.20	215.2	3.39	42.9	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Approved by: M. Summerlin

Date : 11/4/10 Page 1 of 2  
 Field Personnel Jay Ward  
 Well Depth as installed (ft.): 25  
 Screen Length in ft. 5 Screen Depth in ft. 22-25  
 Depth to GW (ft.): 10.55 From: PVC  
 Pump/Tubing Intake set (ft.): From: PVC  
 Sample Designation MW-302  
 Sample Time 10:50

Well ID : MW-302  
 Purging Start Time : 9:35  
 Measured Well Depth (ft.): 24.03  
 Parameter Stabilization: (Circle) Yes / No  
 Two Hour Time Limit Reached? (Circle) Yes / No  
 Total Volume Purged, Including Drawdown (gallons): 305 Gallons  
 Time at Purge Completion: 10:50  
 Signature: [Signature]

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)  
 Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_  
 Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HH:MM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
9:40	10 5	100	11.44	—	—	9.74	3177	3.79	2520	3.81	1462	25PSI
9:45		100	11.81			9.73	3238	3.71	2944	3.38	135	
9:50			12.15			10.12	3327	3.87	3011	2.60	100.7	
9:55			12.40			10.25	3383	3.97	2977	2.24	94.0	
10:00			12.56			10.38	3434	4.04	2944	1.92	80.6	
10:05			12.71			10.40	3483	4.11	2902	1.65	71.3	
10:10			12.83			10.43	3512	4.13	2890	1.55	53.7	
10:15			12.91			10.49	3579	4.22	2849	1.03	53.2	
10:20			12.95			10.51	3652	4.27	2857	1.03	35.6	
10:25			12.97			10.53	3715	4.31	2860	0.86	34.5	
10:30			12.97			10.63	3775	4.34	2855	0.73	29.9	
10:35			12.97			10.68	3830	4.37	2877	0.64	24.0	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 11/30

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Well ID : FMW-302

Field Personnel SW

Purging Start Time :

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.:

Screen Depth in ft.:

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.):

From:

Two Hour Time Limit Reached ? (Circle) Yes / No

Pump/Tubing Intake set (ft.):

From:

Total Volume Purged, Including Drawdown (gallons):

Sample Designation:

Time at Purge Completion:

Sample Time:

Signature: *[Signature]*

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/-10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
11:30	11:30	100	9.94			11.11	681	7.35	-25.1	0.79	8.05	
11:30	11:30		9.94			11.42	720	7.34	-36.0	0.70	8.23	
11:30	11:30		9.97			11.04	762	7.33	-42.2	0.64	7.70	
11:35	11:35		9.97			11.43	716	7.33	-47.2	0.62	8.27	
11:40	11:40		9.97			11.51	820	7.32	-51.3	0.60	7.85	
11:45	11:45		9.97			11.51	835	7.31	-52.5	0.57	7.74	
11:50	11:50		9.97			11.04	842	7.31	-55.2	0.55	7.52	
11:55	11:55		9.97			11.69	854	7.31	-56.2	0.54	7.50	Sample T. 12:02

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Field Personnel Ken Morris

Well Depth as installed (ft): 55

Screen Length in ft. 5

Screen Depth in ft. 50-55

Depth to GW (ft.): 3.87

From: PVC

Pump/Tubing Intake set (ft.): 48.04

From: PVC

Sample Designation MW-304A

Sample Time 1155

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) HPS

Multimeter model and serial number VSI 650 MAST#08810377 Turbidity meter model and serial number Lamotte 2020 C# 12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID : MW-304A

Purging Start Time : 0935

Measured Well Depth (ft.): 1

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached ? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 6

Time at Purge Completion: 1155

Signature: Ken Morris

Clock Time	Discharge / Refill / Pump Setting PSI=30	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/-10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
0955	5 / 10	125	4.11	0.24	-	6.18	312	6.74	178.6	6.08	5.99	Purge water clear	No odor	
1000		125	4.10	-0.01	0.23	6.03	305	6.31	175.5	5.02	4.87			
1005		125	4.10	0.0		7.12	297	6.21	172.1	3.96	4.21			
1010		125	4.10	0.0		7.39	295	6.10	169.7	3.30	4.16			
1015		125	4.10	0.0		7.63	304	6.07	168.8	3.22	4.14			
1020		125	4.10	0.0		7.87	306	6.06	162.1	3.05	4.11			
1025		125	4.10	0.0		8.13	310	6.05	160.8	2.97	3.15	ORP= 160.8		
1030		125	4.10	0.0		8.30	339	6.05	156.9	2.66	1.75	Purge water clear		
1035		125	4.10	0.0		8.32	414	6.08	139.7	1.58	1.61			
1040		125	4.11	0.01	0.24	8.16	689	6.11	115.6	1.59	1.41			
1045		125	4.11	0.0		8.30	979	6.14	84.0	1.21	1.36			
1050	V	125	4.11	0.0		8.24	1173	6.19	70.1	0.98	1.33			

Notes: All depths in feet below top of PVC unless specified.

NR= No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Approved by: M. Summerlin

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Well ID: MW-304 A

Field Personnel Ken Marks

Purging Start Time: 9:35

Well Depth as installed (ft.): 55

Measured Well Depth (ft.):

Screen Length in ft. 5

Screen Depth in ft. 50-55

Depth to GW (ft.): 31.87

From: PVC

Pump/Tubing Intake set (ft.): 48.04

From: PVC

Sample Designation MW-304 A

Parameter Stabilization: (Circle) Yes / No

Sample Time 1155

Two Hour Time Limit Reached? (Circle) Yes / No

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Total Volume Purged, Including Drawdown (gallons): 6

Multimeter model and serial number

Time at Purge Completion: 1155

Turbidity meter model and serial number

Signature: Ken Marks

Notes: (initial wellhead PID/PID reading, deviations from SOP, etc.)

INFO on page #1

Clock Time	Discharge / Refill / Pump Setting PSI = 30	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU			
1055	5 10	125	4.10	-0.01	0.23	8.45	1719	6.31	-11.7	0.81	1.21			
1100		125	4.16	0.0	✓	8.51	2330	6.37	-26.2	0.70	1.29			
1105		125	4.11	0.01	0.24	8.49	2898	6.36	-37.1	0.43	1.31			
1110		125	4.11	0.0		8.70	6329	6.40	-68.9	0.35	1.45			
1115		125	4.11	0.0		8.78	6759	6.42	-69.7	0.34	1.55			
1120		125	4.11	0.0		8.71	7466	6.39	-65.6	0.36	1.51			
1125		125	4.11	0.0		8.65	7559	6.39	-63.7	0.37	1.50			
1130		125	4.11	0.0		8.64	7619	6.38	-61.0	0.40	1.42			
1135		125	4.11	0.0	✓	8.63	7647	6.37	-60.1	0.37	1.40			
1140		125	4.12	0.01	0.25	8.61	7686	6.37	-58.9	0.36	1.28			
1145		125	4.12	0.0	✓	8.58	7669	6.37	-57.9	0.37	1.22			
1150		125	4.12	0.0	✓	8.57	7659	6.37	-55.8	0.41	1.25			

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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Rev.: 2

Prepared by: S. Bonis

Approved by: M. Summerlin

Date : 11/17/11

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Well ID : MW-304B

Field Personnel K Armitage

Purging Start Time : 0941

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.

Screen Depth in ft.

Depth to GW (ft.): 4.15

From: PVC

Parameter Stabilization: (Circle) Yes / No

Pump/Tubing Intake set (ft.): ~20

From: PVC

Two Hour Time Limit Reached? (Circle) Yes / No

Sample Designation

Total Volume Purged, Including Drawdown (gallons): ~4.5

Sample Time 1140

Time at Purge Completion: 1138

Signature: *[Signature]*Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) *Pistol Grip*

Multimeter model and serial number Y51650INDS; 99K0637A Turbidity meter model and serial number LaMotte 2050e = ME 14429

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

No product observed. Air temp = 13°F

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp, +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/-10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
0950	NA	NA	142	4.73	—	9.03	1231	6.01	210.9	6.40	9.81			
0955			142	4.66	-0.07	-0.07	9.10	1240	5.96	211.3	6.35	9.00		
1000			150	4.71	0.05	-0.02	9.57	1253	5.89	211.3	6.21	7.12		
1005			150	4.68	-0.03	-0.05	9.38	1256	5.88	211.8	5.91	6.98		
1010			152	4.68	Ø		9.19	1251	5.87	212.2	6.12	6.75		
1015			152	4.68	Ø		9.42	1261	5.65	213.0	5.26	6.75		
1020			150	4.68	Ø		9.43	1274	5.86	213.1	5.52	6.61		
1030			150	4.72	0.04	-0.01	9.68	1537	5.87	213.0	1.28	6.52		
1035			150	4.72	Ø		9.72	1639	5.89	210.0	0.85	5.29		
1040			148	4.70	-0.02	-0.03	9.92	2769	6.05	187.6	0.40	5.08		
1045			145	4.70	Ø		9.50	3112	6.22	172.9	0.46	4.11		
1050			150	4.70	Ø		9.39	3115	6.25	162.4	0.47	3.03		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : <u>1/17/11</u>	Page <u>2</u> of <u>2</u>	Well ID : <u>MW-304B</u>
Field Personnel <u>KArmittage</u>	Purging Start Time :	
Well Depth as installed (ft.): _____	Measured Well Depth (ft.): _____	
Screen Length in ft. _____	Screen Depth in ft. _____	Parameter Stabilization: (Circle) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Depth to GW (ft.): _____	From: _____	Two Hour Time Limit Reached? (Circle) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Pump/Tubing Intake set (ft.): _____	From: _____	Total Volume Purged, Including Drawdown (gallons): _____
Sample Designation: _____	Time at Purge Completion: _____	
Sample Time <u>1140</u>	Signature: <u>[Signature]</u>	
Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) _____		
Multimeter model and serial number _____		Turbidity meter model and serial number _____
Notes: (initial wellhead PID/PID reading, deviations from SOP, etc.)		

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp, +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
10:55	NA	NA	150	4.69	-0.0	-0.02	9.41	3122	6.26	161.1	0.43	2.98		
11:00			148	4.71	0.02	∅	9.57	3139	6.29	150.3	0.42	2.96		
11:05			150	4.71	∅	∅	9.38	3120	6.28	163.4	0.40	2.90		
11:10			150	4.70	-0.01	-0.01	9.41	3119	6.29	162.7	0.40	2.92		
11:15			150	4.72	+0.02	+0.03	9.56	3127	6.29	158.3	0.40	2.89	0.01 DTW	
11:20			150	4.72	∅	0.01	9.53	3124	6.30	149.8	0.38	2.85	4.00 change = 78.2	
11:25			150	4.73	0.01	0.02	9.59	3118	6.30	138.9	0.38	2.87		
11:30			148	4.73	∅	0.02	9.61	3112	6.29	136.2	0.41	2.86		
11:35			150	4.73	∅		9.66	3109	6.30	140.9	0.42	2.84		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 12/15/11 Page 1 of \_\_\_\_\_  
 Field Personnel (Signature) / Paul Xyligas  
 Well Depth as installed (ft.): 0 ft.  
 Screen Length in ft. 0 ft. Screen Depth in ft. PVC  
 Depth to GW (ft.): 47.7 From: \_\_\_\_\_  
 Pump/Tubing Intake set (ft.): 3' From Bottom From: 4'  
 Sample Designation MW-305B  
 Sample Time 10:50

Well ID : MW-305B  
 Purging Start Time : 10:00  
 Measured Well Depth (ft.): 18.2 ft  
 Parameter Stabilization: (Circle) Yes / No  
 Two Hour Time Limit Reached? (Circle) Yes / No  
 Total Volume Purged, Including Drawdown (gallons): 4.0  
 Time at Purge Completion: \_\_\_\_\_  
 Signature: (Signature)

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) \_\_\_\_\_

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
10:05	10 sec / sec. or setting	180 ml/min	7.21		9.61	333	5.18	235.4	3.25	8.56e	20 PSI	
10:10		180	7.21		9.56	288	4.76	239.2	1.73	10.5		
10:15		180	7.21		9.90	278	4.74	239.2	1.56	71.6		
10:20		180	7.21		10.05	271	4.72	246.0	1.45	48.0		
10:25		180	7.21		10.09	265	4.70	249.7	1.30	32.8		
10:30		180	7.21		10.21	262	4.69	252.1	1.28	30.4		
10:35		180	7.21		10.21	258	4.68	254.5	1.18	27.8		
10:40		180	7.21		10.25	254	4.67	257.6	1.17	27.5		
												Sample 10:50

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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Rev.: 2

Prepared by: S. Bonis

Approved by: M. Summerlin

Date: 1-21-11

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Well ID: MW - 306

Field Personnel Ken Marks

Purging Start Time: 1015

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.

Screen Depth in ft.

Depth to GW (ft.): 8.17

From:

Parameter Stabilization: (Circle) Yes / No

Pump/Tubing Intake set (ft.): 22.84

From:

Two Hour Time Limit Reached? (Circle) Yes / No

Sample Designation

MW - 306

Total Volume Purged, Including Drawdown (gallons): 1.5

Sample Time 1105

Time at Purge Completion:

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Signature: Ken Marks

Multimeter model and serial number VSI 650 MDS #18B10377 Turbidity meter model and serial number LaMotte 2020 e #12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting PSI = 20	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if > 0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm					
1025	5 10	100	8.22	0.05	-	8.74	314	6.83	28.5	5.89	219	
1030		100	8.25	0.03	0.08	8.68	299	6.72	29.7	5.25	114	
1035		100	8.26	0.01	0.09	8.75	293	6.70	33.9	4.70	72.4	
1040		100	8.27	0.01	0.10	8.78	294	6.71	18.6	4.24	43.6	
1045		100	8.30	0.03	0.13	8.81	291	6.71	12.6	3.93	20.1	
1050		100	8.31	0.01	0.14	8.87	289	6.72	-1.5	3.49	11.6	
1055		100	8.31	0.01	0.14	8.86	289	6.72	-1.7	3.41	11.1	
1100	SV	100	8.31	0.01	0.14	8.88	289	6.72	-1.8	3.40	11.0	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.

 Nobis Engineering, Inc. nobisengineering.com	<b>Low-Flow Field Log</b>		SOP No: SA-003	Attachment B, Page 1 of 1
			Date: Mar. 2010	Rev.: 2
	Prepared by:	S. Bonis		
	Approved by:	M. Summerlin		

Date : <u>11/11/11</u>	Page <u>1</u> of <u>1</u>	Well ID: <u>KMW-403A</u>
Field Personnel <u>SDS Paul Vining</u>		Purging Start Time: <u>9:45</u>
Well Depth as installed (ft.):		Measured Well Depth (ft.): <u>47.11</u>
Screen Length in ft.	Screen Depth in ft.	Parameter Stabilization: (Circle) Yes / No
Depth to GW (ft.): <u>7.51</u>	From:	Two Hour Time Limit Reached? (Circle) Yes / No
Pump/Tubing Intake set (ft.):	From:	Total Volume Purged, Including Drawdown (gallons): _____
Sample Designation		Time at Purge Completion: _____
Sample Time <u>KMW-403A</u>		Signature: <u>(Signature)</u> _____
Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) _____		
Multimeter model and serial number _____		Turbidity meter model and serial number _____
Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)		

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if < 0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU			
9:50	15		8.02			23.83	620	6.62	129.2	3.22	220	23.25F		
9:55			8.14			23.77	225	6.21	152.0	2.88	278			
10:00			8.15			23.74	625	5.92	166.6	3.15	278			
10:05			8.16			23.71	630	5.64	181.2	3.65	227			
10:10			8.17			23.68	632	5.52	187.7	3.53	189			
10:15			8.17			23.59	631	5.46	161.5	3.95	160			
10:20			8.17			23.39	631	5.43	154.0	3.53	153			
10:25			8.17			23.55	630	5.44	155.3	3.96	158			
10:30			8.17			23.50	630	5.42	156.7	3.81	162			
10:35			8.17			23.56	629	5.41	157.8	3.78	162			
10:40			8.17			23.58	628	5.42	148.2	3.76	162			
												Sc-pk Time 10:45		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 11/17/14 Page 1 of 1  
 Field Personnel (S. Bonis P. Y. J. -)  
 Well Depth as installed (ft.): 21.59  
 Screen Length in ft. 10ft Screen Depth in ft.  
 Depth to GW (ft.): 8.01 From: PVC  
 Pump/Tubing Intake set (ft.): 3' from Bottom From:  
 Sample Designation RMW-4033  
 Sample Time 11:05

Well ID: RMW 4033  
 Purging Start Time: 9:55  
 Measured Well Depth (ft.): 21.59  
 Parameter Stabilization: (Circle) Yes  No  
 Two Hour Time Limit Reached? (Circle) Yes /   
 Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_  
 Time at Purge Completion: \_\_\_\_\_  
 Signature: J.W.J.

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)  
 Multimeter model and serial number DVC 3884A3 Turbidity meter model and serial number 14432  
 Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)  
DTW TOP of casing

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if >5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm							
10:10	10	5	100	9.76	-	9.36	774	6.33	957	4.25	274	17 psi		
10:15			100	10.87		9.35	765	6.09	108.4	4.06	201			
10:20			100	11.65		9.41	763	6.07	103.1	4.07	174			
10:25			100	12.46		9.46	763	6.06	95.4	4.04	165			
10:30			100	13.25		9.47	761	6.07	87.7	3.99	162			
10:35			100	13.66		9.57	761	6.07	79.6	3.99	166			
10:40			100	14.33		9.63	760	6.06	72.5	3.97	159			
10:45			100	15.07		9.65	760	6.07	62.9	3.85	146	148		
10:50			100	15.3		9.65	760	6.08	58.5	3.85	142			
10:55			100	16.17		9.69	760	6.07	55.1	3.85	136	Sayph Free 11:05		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Approved by: M. Summerlin

Date : 11/3/11

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Well ID : MW-505 MW-406-A

Field Personnel \_\_\_\_\_

Purging Start Time : 10:15

Well Depth as installed (ft.): \_\_\_\_\_

Measured Well Depth (ft.): 102.75

Screen Length in ft. \_\_\_\_\_

Screen Depth in ft. \_\_\_\_\_

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.): 3.46

From: \_\_\_\_\_

Two Hour Time Limit Reached ? (Circle) Yes / No

Pump/Tubing Intake set (ft.): \_\_\_\_\_

From: \_\_\_\_\_

Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_

Sample Designation \_\_\_\_\_

Time at Purge Completion: \_\_\_\_\_

Sample Time \_\_\_\_\_

Signature: JWN

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) \_\_\_\_\_

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
												mV	mg/L	NTU
10:20	100	8.9	—	—	10.27	60.2	7.35	105.7	3.57	12.4				
10:25	100	8.15			10.21	60.3	7.13	1080	2.31	12.0				
10:30	100	9.30			10.44	60.7	7.11	835	1.97	10.62				
10:35	100	9.57			11.05	60.5	7.14	60.4	1.77	10.26				
10:40		9.70			11.30	60.3	7.18	3256	1.47	9.43				
10:45		9.84			11.36	60.1	7.24	17.5	1.18	10.32				
10:50		9.90			11.35	60.1	7.23	7.3	1.05	9.42				
10:55		9.90			11.31	60.0	7.31	7.31	0.98	9.42				
11:00		9.90			11.30	60.0	7.34	6.3	6.10	9.24				
11:05		9.94			11.25	60.6	7.35	16.9	0.85	5.21				
11:10		9.94			11.26	62.7	7.35	-23.4	0.78	7.97				
11:15		9.94			11.24	64.4	7.36	-24.4	0.99	9.49				

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 3/15 Page 2 of 2

Field Personnel SW

Well Depth as installed (ft.):

Screen Length in ft. Screen Depth in ft.

Depth to GW (ft.) From:

Pump/Tubing Intake set (ft.) From:

Sample Designation

Sample Time

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number Turbidity meter model and serial number

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID : MW-502 MW-426A  
Purging Start Time :

Measured Well Depth (ft.):

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached ? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons):

Time at Purge Completion:

Signature: SW

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
11:30	445	100	9.94			11.11	691	7.35	-25.1	0.79	8.05			
11:35			9.94			11.42	720	7.34	-360	0.70	8.23			
11:30			9.97			11.41	762	7.33	-42.2	0.64	7.70			
11:35			9.97			11.43	796	7.33	-47.2	0.62	7.27			
11:40			9.97			11.51	820	7.32	-51.3	0.60	7.85			
11:45			9.97			11.51	835	7.31	-52.5	0.51	7.74			
11:50			9.97			11.64	949	7.31	-55.2	0.55	7.52			
11:55			9.97			11.69	854	7.31	-56.2	0.54	7.50	Sample T. 12:00		

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 1-13-11 Page 1 of 2

Field Personnel Ken Marks

Well Depth as installed (ft.): 130

Screen Length in ft. 35

Screen Depth in ft. 38 43

Depth to GW (ft.): 8.61

From: \_\_\_\_\_

Pump/Tubing Intake set (ft.): 57.94

From: \_\_\_\_\_

Sample Designation \_\_\_\_\_

Sample Time 1310

Well ID: MW-406 B

Purging Start Time: 1010

Measured Well Depth (ft.): \_\_\_\_\_

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 5

Time at Purge Completion: 1205

Signature: Ken Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder - PST-30

Multimeter model and serial number VST 650 MDS #08810377 Turbidity meter model and serial number La Motte 2020 Q #12233

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Clock Time	Discharge / Refill / Pump Setting PSI = 30	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations		
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm							
1020	7.5	150	8.66	0.05	—	11.04	806	5.91	190.4	2.30	33.9	Purge water slightly cloudy		
1035		150	8.66	0.0	0.05	11.15	814	5.74	192.6	1.50	54.9	light gray		
1030		150	8.66	0.0	0.05	11.41	813	5.77	193.7	1.29	60.9			
1035		150	8.66	0.0	0.05	11.44	810	5.80	194.6	1.26	59.1			
1040		150	8.66	0.0	0.05	11.35	803	5.83	194.7	1.16	59.0			
1045		150	8.66	0.0	0.05	11.36	796	5.88	194.2	1.12	50.1			
1050		150	8.66	0.0	0.05	11.34	790	5.92	193.9	1.09	44.6			
1055		150	8.66	0.0	0.05	11.33	781	5.93	193.7	1.06	31.6			
1100		150	8.66	0.0	0.05	11.31	773	5.96	192.8	1.03	45.8			
1105		150	8.66	0.0	0.05	11.27	761	5.99	191.9	1.02	36.2			
1110		150	8.66	0.0	0.05	11.09	752	6.02	190.7	1.03	31.0			
1115		150	8.66	0.0	0.05	11.03	741	6.07	189.6	1.03	20.8			↓

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 1-13-11

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Well ID : MW-406B

Field Personnel Ken Marks

Purging Start Time : 1010

Well Depth as installed (ft):

Measured Well Depth (ft):

Screen Length in ft.

Screen Depth in ft.

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft): 8.61

From:

Two Hour Time Limit Reached ? (Circle) Yes / No

Pump/Tubing Intake set (ft.): 57.94

From:

Total Volume Purged, Including Drawdown (gallons): 5

Sample Designation MW-406B

Time at Purge Completion: 1005

Sample Time 1010

Signature: Ken Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number Turbidity meter model and serial number

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well info on page #1

Page # 2 of 2

Clock Time	Discharge / Refill / Pump Setting PSI=30	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/-10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
1120	7.5 7.5	150	8.66	0.0	0.05	11.14	737	6.10	188.6	1.15	20.1	Page # 2 of 2
1125		150	8.66	0.0	0.05	11.23	737	6.12	87.5	1.04	18.1	ORP=187.5
1130		150	8.66	0.0	0.05	11.44	736	6.13	186.5	1.02	16.0	Purge water slightly cloudy
1135		150	8.66	0.0	0.05	11.37	732	6.14	186.2	0.97	14.2	
1140		150	8.66	0.0	0.05	11.25	728	6.14	186.1	0.93	12.1	
1145		150	8.66	0.0	0.05	11.19	726	6.15	185.8	0.97	11.0	
1150		150	8.66	0.0	0.05	11.26	723	6.17	184.7	0.94	9.37	
1155		150	8.66	0.0	0.05	11.17	722	6.17	184.6	0.92	8.39	
1200		150	8.66	0.0	0.05	11.28	722	6.18	184.4	0.96	8.33	
1205		150	8.66	0.0	0.05	11.31	722	6.18	184.2	0.97	8.31	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 11/11/11 Page 1 of 2  
 Field Personnel K Armistead  
 Well Depth as installed (ft.): unk  
 Screen Length in ft. unk Screen Depth in ft. unk  
 Depth to GW (ft.): 3.28 From: PVC  
 Pump/Tubing Intake set (ft.): 29.00 From: PVC  
 Sample Designation B-05-01111  
 Sample Time 1140

Well ID : B-5  
 Purging Start Time : 1002  
 Measured Well Depth (ft.): 32.09  
 Parameter Stabilization: (Circle) Yes / No  
 Two Hour Time Limit Reached? (Circle) Yes (No)  
 Total Volume Purged, Including Drawdown (gallons):  $5 + 0.75 = 5.75$   
 Time at Purge Completion: 1137  
 Signature: [Signature]

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder 105 : q~35 psi : R/D = 10/5  
 Multimeter model and serial number YSI 650MDS : 91K0637AA Turbidity meter model and serial number LaMotte 2020E : ME 14476  
 Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

No product observed. Overcast

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/-10 mV	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
1015	5	10	244	3.11	—	9.24	987	5.84	132.5	9.58	31.7	
1020	5	10	244	3.11	Ø	Ø	9.45	909	5.72	119.9	7.71	30.1
1025	5	10	244	3.11	Ø	Ø	9.53	886	5.71	115.7	7.02	24.6
1030	5	10	244	3.11	Ø	Ø	9.63	867	5.70	113.1	6.29	22.5
1035	5	10	244	3.11	Ø	Ø	9.69	851	5.71	112.3	5.96	20.6
1040	5	10	244	3.11	Ø	Ø	9.70	840	5.70	112.2	5.72	20.1
1045	5	10	244	3.11	Ø	Ø	9.80	830	5.71	112.1	5.40	18.1
1050	5	10	244	3.11	Ø	Ø	9.81	820	5.71	113.1	5.15	16.9
1055	5	10	244	3.11	Ø	Ø	9.86	813	5.71	113.7	5.02	15.8
1100	5	10	244	3.11	Ø	Ø	9.87	805	5.71	113.9	4.96	14.1
1105	5	10	244	3.11	Ø	Ø	9.88	800	5.71	114.1	4.90	13.3
1110	5	10	244	3.11	Ø	Ø	9.85	797	5.71	115.3	4.98	12.6

Notes: All depths in feet below top of PVC unless specified.  
 NR = No Reading  
 Use the back of the log to record additional observations and descriptions.

1115 244 3.11 Ø Ø 9.867 925.72 115.9 4.92 12.4



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## Low-Flow Field Log

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Rev.: 2

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Field Personnel Karmitage  
W-11 D-1 E-1 H-1 I-1 S-1

Well Depth as installed (ft.): 0

Screen Length in ft. \_\_\_\_\_

Depth to GW (ft.): \_\_\_\_\_ From: \_\_\_\_\_

Pump/Tubing Intake set (ft.): \_\_\_\_\_ From: \_\_\_\_\_

Sample Designation

Sample Designation 1140

Sample Time 7/7/00

Pump Type (include pressure, discharge, and rechar

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

—  
—

Well ID : B-5

Purging Start Time :

Measured Well Depth (ft.):

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached 3 (Circle) Yes / No

Total Number Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): \_\_\_\_\_

### Time at Purge Completion

Signature: Huntage

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the lot to record additional observations and descriptions.



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## Low-Flow Field Log

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Date: Mar. 2010Attachment B, Page 1 of 1  
Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 1-11-11	Page 1 of 2	Well ID: P-1
Field Personnel Ken Marks		Purging Start Time: 1330
Well Depth as installed (ft.):		Measured Well Depth (ft.):
Screen Length in ft.	Screen Depth in ft.	Parameter Stabilization: (Circle) Yes / No
Depth to GW (ft.): 3.98	From:	Two Hour Time Limit Reached? (Circle) Yes / No
Pump/Tubing Intake set (ft.):	From:	Total Volume Purged, Including Drawdown (gallons): 6
Sample Designation P-1		Time at Purge Completion:
Sample Time 1455		Signature: Ken Marks
Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) Bladder PSE = 15		
Multimeter model and serial number KTI 650 MDS#08810377 Turbidity meter model and serial number Ly/Matto 2020 C# 12233		
Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.) This well has a good recharge.		

Clock Time	Discharge / Refill / Pump Setting PSE = 15	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm	mV	mg/L	NTU	
1330	10 5	300	3.80	-	-	9.93	348	6.23	111.6	3.43	192 Purge water slightly cloudy
1335		300	3.80	-	-	10.10	324	5.99	126.7	3.01	175 gray
1340		300	3.80	-	-	10.24	322	5.90	146.1	1.04	115 Page # 1 of 2
1345		300	3.80	-	-	10.41	326	5.87	157.9	1.00	86.8
1350		300	3.80	-	-	10.60	328	5.87	164.4	0.99	69.4
1355		300	3.80	-	-	10.79	329	5.86	172.7	0.97	39.7
1400		300	3.80	-	-	10.81	329	5.85	177.4	1.05	41.1
1405		300	3.80	-	-	10.85	330	5.85	182.7	1.13	38.6
1410		300	3.80	-	-	10.85	331	5.85	186.9	1.20	38.6
1415		300	3.80	-	-	10.84	331	5.85	191.1	1.24	26.2
1420		300	3.80	-	-	10.82	331	5.85	196.4	1.30	17.7
1425		300	3.80	-	-	10.75	330	5.84	199.2	1.33	14.3

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date: 1-11-11

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Well ID: P-1

Field Personnel Ken Marks

Purging Start Time:

Well Depth as installed (ft.):

Measured Well Depth (ft.):

Screen Length in ft.

Screen Depth in ft.

Parameter Stabilization: (Circle) Yes / No

Depth to GW (ft.):

From:

Two Hour Time Limit Reached? (Circle) Yes / No

Pump/Tubing Intake set (ft.):

From:

Total Volume Purged, Including Drawdown (gallons):

Sample Designation

Time at Purge Completion: 1450

Sample Time 1455

Signature: Ken Marks

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number Turbidity meter model and serial number

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well info see page # 1

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if >5 NTU	Comments / Gas Pressure / Observations
1430		300	3.80	-	-	10.68	330	5.84	201.9	1.56	14.1	Page # 2 of 2
1435		300	3.80	-	-	10.72	330	5.85	203.9	1.62	12.8	
1440		300	3.80	-	-	10.70	330	5.84	206.9	1.65	12.2	
1445		300	3.80	-	-	10.72	330	5.84	207.3	1.66	12.1	S. cond = 330
1450		300	3.80	-	-	10.71	330	5.84	207.8	1.64	12.0	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2

Date : 11/11/11 Page 1 of 1  
Field Personnel Sayda  
Well Depth as installed (ft.): 55  
Screen Length in ft. 15 Screen Depth in ft. 36-51  
Depth to GW (ft.): 41.86 From: PVC  
Pump/Tubing Intake set (ft.): 3' From Bottom From: \_\_\_\_\_  
Sample Designation RW-1  
Sample Time 10:50

Well ID : RD-1  
Purging Start Time : 10:10  
Measured Well Depth (ft.): 53.99  
Parameter Stabilization: (Circle) Yes / No  
Two Hour Time Limit Reached ? (Circle) Yes No  
Total Volume Purged, Including Drawdown (gallons): 20  
Time at Purge Completion: \_\_\_\_\_  
Signature: [Signature]

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments) \_\_\_\_\_

Multimeter model and serial number \_\_\_\_\_ Turbidity meter model and serial number \_\_\_\_\_

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Notes: All depths in feet below top of PVC unless specified

NR = No Reading

Use the back of the log to record additional observations and descriptions.



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## Low-Flow Field Log

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Rev.: 2Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : <u>11/7/10</u>	Page <u>1</u> of <u>2</u>	Well ID : <u>RMW-102</u>
Field Personnel <u>Jay Ward</u>		Purging Start Time : <u>10:05</u>
Well Depth as installed (ft.): <u>10</u>		Measured Well Depth (ft.): <u>12.12</u>
Screen Length in ft. <u>5</u>	Screen Depth in ft. <u>5-10</u>	Parameter Stabilization: (Circle) Yes / No
Depth to GW (ft.): <u>4.42</u>	From: <u>TPVC</u>	Two Hour Time Limit Reached? (Circle) Yes / No
Pump/Tubing Intake set (ft.):	From: <u>TPVC</u>	Total Volume Purged, Including Drawdown (gallons): <u>5.0</u>
Sample Designation <u>RMW-102</u>		Time at Purge Completion: _____
Sample Time <u>11:56</u>		Signature: <u>J. Ward</u>
Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)		
Multimeter model and serial number _____ Turbidity meter model and serial number _____		
Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)		

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
10:10		140	6.65			4.99	414	6.04	2042	210	12.4	
10:15		140				4.82	416	5.91	2070	201	87.2	
10:20						4.86	416	5.70	2073	206	80.0	
10:25						4.84	416	5.91	2076	116	50.4	
10:30						4.81	414	5.92	2075	131	45.6	
10:35						4.80	409	5.93	2073	162	31.8	
10:40						4.83	410	5.93	2076	158	25.1	
10:45						4.87	406	5.73	2075	142	21.7	
10:50						5.10	402	5.74	2073	146	19.0	
10:55						5.69	400	5.94	2073	126	12.6	
11:00						5.87	397	5.75	2070	112	15.3	
11:05						5.71	395	5.96	2051	0.79	13.6	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



Nobis Engineering, Inc. nobisenengineering.com

## Low-Flow Field Log

SOP No: SA-003  
Date: Mar. 2010

Attachment B, Page 1 of 1  
Rev.: 2

Prepared by: S. Bonis  
Approved by: M. Summerlin

Date : 11/17/10

Page 2 of 2

Field Personnel Jay W.

Well Depth as installed (ft.): 10

Screen Length in ft. 5 Screen Depth in ft. 5-10

Depth to GW (ft.): 4.46

From: TPVC

Pump/Tubing Intake set (ft.): RMW-102

From: TPVC

Sample Designation RMW-102

Sample Time 11:50

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number Turbidity meter model and serial number

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID : RMW-102

Purging Start Time : 10:25

Measured Well Depth (ft.): 12.12

Parameter Stabilization: (Circle) Yes No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons): 510

Time at Purge Completion:

Signature: (Initials)

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if > 0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm					
11:10		140	6.65			56.85	351	5.97	204.5	0.95	10.5	
11:15						56.8	359	5.97	204.2	0.96	10.1	
11:20						5.42	337	5.97	203.7	0.91	9.90	
11:25						5.34	355	5.97	202.1	0.77	9.13	
11:30						5.41	354	5.98	202.1	0.74	9.10	
11:35						5.32	383	5.98	201.4	0.69	8.79	
11:40			↓			5.43	379	6.00	200.4	0.68	8.77	Sept T: ~ 11:50

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.



Nobl's Engineering, Inc. noblsegineering.com

## Low-Flow Field Log

SOP No: SA-003

Date: Mar. 2010

Attachment B, Page 1 of 1

Rev.: 2

Prepared by: S. Bonis

Approved by: M. Summerlin

Date: 11/21/11

Page 1 of 1

Field Personnel Karmiteg

Well Depth as installed (ft.): 811

Screen Length in ft. 2

Screen Depth in ft. 7-11

Depth to GW (ft.): 6.90

From: Std pipe

Pump/Tubing Intake set (ft.):

From:

Sample Designation WP-105

Sample Time 110

Pump Type (include pressure, discharge, and recharge for bladder pump under pump setting and comments)

Multimeter model and serial number 31650MDS:99K0631PA Turbidity meter model and serial number LWT-He 2020e : MEI4429

Notes: (initial wellhead PID/FID reading, deviations from SOP, etc.)

Well ID: WP-105

Purging Start Time: 1050 KN

Measured Well Depth (ft.): 12.69

Parameter Stabilization: (Circle) Yes / No

Two Hour Time Limit Reached? (Circle) Yes / No

Total Volume Purged, Including Drawdown (gallons):

Time at Purge Completion: 1060

Signature:

Clock Time	Discharge / Refill / Pump Setting	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp. +/- 3%	Spec. Cond. +/- 3%	pH +/- 0.1	ORP +/- 10	DO +/- 10% if >0.5 mg/L	Turbidity +/- 10% if > 5 NTU	Comments / Gas Pressure / Observations
HHMM	sec. / sec. or setting	ml/min	ft.	ft.	ft.	°C	µS/cm		mV	mg/L	NTU	
1050	NA NA	212	6.90	—	—	4.33	359	7.96	172	2.57		
1055		240				4.62	58	7.40	168.9	1.58		
1059						5.24	572	6.64	151.4	1.10	1.74	
1105						5.34	572	6.43	148.1	0.82	0.59	
1110						5.41	570	6.34	135.6	0.60	3.07	
1115						5.44	570	6.30	124.1	0.42	5.44	
1120						5.46	569	6.24	121.2	0.33	2.25	
1125						5.46	569	6.24	120.6	0.43	1.45	
1130						5.42	570	6.29	117.0	0.41	1.48	
1135						6.07	570	6.24	114.8	0.39	1.43	

Notes: All depths in feet below top of PVC unless specified.

NR = No Reading

Use the back of the log to record additional observations and descriptions.

**A  
P  
P  
E  
N  
D  
I  
X  
B**



Engineering a Sustainable Future

Nobis Engineering, Inc. | New Hampshire | Massachusetts

April 8, 2011  
Nobis File No. 80022

Mr. Jim DiLorenzo  
Task Order Project Officer  
U.S. Environmental Protection Agency  
New England Region I  
5 Post Office Square  
Suite 100, Mailcode OSRR07-4  
Boston, MA 02109-3912

Re: Contract No.: EP-S1-06-03  
Task Order No. 0022-RA-RA-0115  
Case No. E005S, Summary of 10 SDGs  
Region I OEME Laboratory, North Chelmsford, Massachusetts 01863  
Nyanza Chemical Waste Dump Superfund Site, OU2  
Ashland, Massachusetts  
CERCLA#: MAD990685422  
Tier I Modified Organic and Inorganic Data Validation

Volatiles: 29/GW/ EP0111-EP0162  
Semi-  
Volatile: 27/GW/ EP0111-EP0162  
1,4-  
Dioxane: 29/GW/ EP0111-EP0162  
Metals: 27/GW/ EP0111-EP0162  
Mercury: 27/GW/ EP0111-EP0162  
Anions: 27/GW/ EP0111-EP0162  
(2/Equipment Blanks/EP0118, EP0151)  
(9/Trip Blanks/EP0119, EP0127, EP0131, EP0135, EP0139, EP0148,  
EP0152, EP0158, EP0162)  
(2 sets PEs/EP0140(HG5754), EP0120(HG5877), EP0141(IS0640),  
EP0121(IS1302), EP0142(SV0328), EP0122(SV0525), EP0123(VLM0213),  
EP0143(VLM0573))

Dear Mr. DiLorenzo:

Nobis Engineering, Inc. performed a Tier I Modified data validation in accordance with the Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996 Criteria, on the organic and inorganic analytical data for 29 groundwater samples, 2 equipment blanks, 9 trip blanks, and two sets of performance evaluation (PE) samples. The samples were collected by Nobis Engineering, Inc. at the Nyanza Chemical Waste Dump Superfund Site, OU2 located in Ashland, Massachusetts in January 2011. The samples were analyzed by EPA Region I Laboratory Methods for Volatile Organic Compounds (VOCs) [EIASOP-VOAGCMS9], for Semi-Volatile Organic Compounds (SVOCs)

**Client-Focused, Employee-Owned**

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[EIASOP-BNAW2], for 1,4-dioxane (EIASOP-VOAUDIOX4), for Metals (EIASOP-INGDVICP), for Mercury (EIASOP-INGMERC9.SOP), and for anions (EIASOP-INGIC11). A Tier I modified data validation was deemed sufficient at this time.

The data were evaluated based on the following parameters:

- \*     • Overall Evaluation of Data and Potential Usability Issues
    - Data Completeness
    - Preservation and Technical Holding Times
    - Blanks
    - Laboratory Control Samples (LCS/LCSDs)
  - \*     • PE Samples
    - Field Duplicates
    - Laboratory Duplicates
    - Matrix Spike/Matrix Spike Duplicate (MS/MSDs)
  - \*     • Surrogate Compounds (organics only)
  - NR    • Internal Standards (ISTDs)
  - \*     • Reported Quantitation Limits
- \*     All criteria were met for this parameter.  
N/A Not analyzed for this Sample Data Group.  
NR Not reported.

#### **Overall Evaluation of Data and Potential Usability Issues:**

The groundwater data obtained during this project are intended to support the DNAPL extraction remedy and design. Although no risk assessment is intended to be performed, groundwater data may be compared to applicable State and Federal criteria, including Massachusetts Contingency Plan (MCP) GW-1 and GW-2 standards, EPA Maximum Contaminant Levels (MCLs), and MCP S-1/GW-1 standards.

The data are acceptable for the intended use for this project with the exception of the biases and qualifications noted below.

#### **Data Completeness:**

Full data packages were not submitted. Only sample results and QC sample results were provided. Ten sample delivery groups (SDGs) were submitted, analyzed, and reported by the laboratory. Separate detailed DV memos were created for each SDG. This memo is a summary of the issues that would result in some estimation or impact on the data only.

Data presented in the Summary Tables include qualifiers assigned by the laboratory. Qualifications for these parameters were not assessed under Tier I validation.

**Preservation and Technical Holding Times:**

The combined Nitrate/Nitrite values for samples EP0111-EP0114 were reported from a diluted run of a preserved portion of the sample; however those samples missed the analysis holding time by 8 days. The sample results should be considered biased low. Bromide also missed the holding time in sample EP0111 and would be considered biased low. However, Bromide is not a target compound.

All samples missed the analysis holding time for nitrate and nitrite by 1 day due to laboratory error. The sample results should be considered biased low.

**Blanks:**

Anions were analyzed in the equipment blank, EP0118. Fluoride was detected at 0.16 ppm and Sulfate was detected at 4.7 ppm (RL= 0.1 ppm). Since the detection level of Sulfate in the associated field samples was greater than the blank action level and the sample quantitation limit, Sulfate would be reported as unqualified in samples EP0115-EP0117. The results for Fluoride in each of the associated field samples were above the sample quantitation limit but below the action level (0.80 ppm) and would be qualified as undetected in samples EP0115-EP0117. Fluoride is not a project target analyte.

Acetone was detected in the trip blank (EP0148) with a value above the reporting limit at 3.0 ppb (RL=1ppb). Sample EP0144 had a detection of Acetone at 1.2 ppb (RL=1ppb) and Acetone was also detected in sample EP0147 at 11 ppb (RL=10ppb). Although the results for Acetone in EP0144 and EP0147 are above the reporting limit, they are less than the action level (30 ppb) and would be qualified as undetected in a tier II validation.

Acetone was detected in the trip blank (EP0152) with a value above the reporting limit at 2.9 ppb (RL=1ppb). Sample EP0151 (equipment blank) had a detection of Acetone at 2.3 ppb. Although the result for Acetone in sample EP0151 is above the reporting limit, it is less than the action level (29 ppb) and would be qualified as undetected in a Tier II validation.

Acetone was detected in the trip blank (EP0158) with a value above the reporting limit at 2.6 ppb (RL=1 ppb). Acetone was detected in sample EP0155 at 1.0 ppb and in sample EP0157 at 1.2 ppb. If a Tier II validation were completed, Acetone in sample EP0155 would be reported as non-detected at the reporting limit (1 ppb U). In sample EP0157, Acetone would be qualified as undetected (U) since the result is less than the action limit (26 ppb).

Acetone was detected in the trip blank (EP0162) with a value above the reporting limit at 2.4 ppb (RL=1 ppb). Sample EP0161 had a detection of Acetone at 1 ppb. If a tier II validation were completed, this analyte would be reported as non-detect at the reporting limit (1 ppb U) in sample EP0161. All other samples were non-detected for this compound.

**Laboratory Control Samples:**

The following list summarizes the measurement error associated with analysis criteria for the LCS.

**Semi-volatiles:**

- 1,3-Dinitrobenzene and Benzidine recovered below the QC limits and Benzoic acid was not recovered in the LCS. These compounds are not in the QAPP target analyte list. However, reported results should be considered estimated biased low (J/UJ) in samples EP0111-EP0114.
- 1,3-Dinitrobenzene and 3-Methylcholanthrene recovered below the QC limits. These compounds are not in the QAPP SVOC target analyte list. However, these compounds would be estimated (J/UJ) and biased low in samples EP0115-EP0117.
- 1,3-Dinitrobenzene and 3-Methylcholanthrene recovered below the QC limits and Kepone was not recovered in the LCS. These compounds are not in the QAPP SVOC target analyte list. However, these compounds would be estimated (J/UJ) and biased low in samples EP0124-EP0126 and EP0128-EP0130. Kepone would be rejected (R) for non-detections.
- 4-Chlorophenyl-phenylether recovered below QC limits and is a target analyte. Had a Tier II validation been performed, detects and non-detects would be estimated (J/UJ) in samples EP0124-EP0126 and EP0128-EP0130.
- 1,3-Dinitrobenzene recovered below the QC limits and Benzoic Acid and N-Nitrosodimethylamine were not recovered in the LCS. These compounds are not in the QAPP SVOC target analyte list. However, these compounds would be estimated (J/UJ) and biased low in samples EP0132-EP0138.
- 3,3'-Dichlorobenzidine, 4,nitroquinoline-1-oxide and Benzoic Acid were not recovered in the LCS. If a Tier II validation were performed, the following actions would be applied to these analytes: positive results would have been estimated (J) and non-detected results rejected (R) in samples EP0144-EP0147, EP0149-EP0153, and EP0154-EP0157. 4-nitroquinoline-1-oxide and Benzoic acid are not target analytes.
- 3,3'-Dichlorobenzidine and Benzoic Acid were not recovered in the LCS. Benzoic acid is not in the QAPP target analyte list. If a tier II validation were performed, positive results for these analytes would be estimated (J) and non-detects would be rejected (R) in samples EP0159-EP0161.

**Field Duplicates:**

Samples EP0112 and EP0113 were collected as field duplicates and analyzed for all methods.

For the Volatiles analysis, Vinyl Chloride was detected in both samples at a concentration greater than twice the sample quantitation; however the RPD result was greater than 30%. For the Semi-Volatiles analysis, Aniline also was detected in both samples at a concentration greater than twice the sample quantitation with an RPD result greater than 30%. Vinyl Chloride and Aniline should be considered estimated in samples EP0122 and EP0113 (J) due to result variability.

**Laboratory Duplicates:****Anions:**

The precision RPD for Nitrate exceeded the QC limits in sample EP0149. Nitrate was detected at 6.0ppm in the parent sample and was reported from a 25x dilution. In a Tier II validation, Nitrate results would be estimated (J) in samples EP0149-EP0153.

The RPD was outside control limits for Bromide in sample EP0160, which is not a target analyte. However, a Tier II validation would qualify bromide results as estimated (J) in samples EP0159-EP0161.

**Matrix Spike/Matrix Spike Duplicate (MS/MSD):****Volatiles:**

The percent recovery in the MSD for 1,2,3-Trichlorobenzene was below QC limits. This analyte would be flagged estimated (J/UJ) in sample EP0114.

The relative percent difference (RPD) for the compound Vinyl Acetate was not within the QC acceptance criteria in the MS/MSD of sample EP0132. The result for this analyte in sample EP0132 would be estimated (J/UJ). Vinyl Acetate is not a target analyte.

**Semi-Volatiles:**

The following compounds could not be calculated due to a 0% recovery in sample EP0125: Benzoic acid, Benzyl alcohol, Bis(2-chloroethyl)ether, and Phenol. Benzoic acid and Benzyl alcohol are not a target analytes. However, if a Tier II validation were performed, the following actions would be applied to these non-compliant analytes in sample EP0125: positive results would have been estimated (J) and non-detected results rejected (R).

The following compounds were recovered below QC limits: 1,2,4,5-Tetrachlorobenzene, 2,6-Dinitrotoluene, Kepone, and methyl methanesulfonate. If a Tier II validation were performed, the following actions would be applied to these analytes in sample EP0125: results would be estimated (J/UJ). Kepone and Methyl methanesulfonate are not target analytes.

The percent recovery for 4-nitroquinoline-1-oxide was above QC limits. If a Tier II validation were performed, positive results would be estimated (J) and non-detections would be accepted in sample EP0125. 4-nitroquinoline-1-oxide is not a target analyte.

The following compounds could not be calculated due to a 0% recovery in sample EP0134: Benzidine and 2,2-oxybis(1-chloropropane). If a Tier II validation were performed, the following actions would be applied to these analytes in sample EP0134: positive results would have been estimated (J) and non-detected results rejected (R). Benzidine is not a target analyte.

The following compounds were recovered below QC limits: 1,4 Naphthoquinone, Anthracene, 4-nitroquinoline-1-oxide, Pyrene, Chrysene, and Benzo(g,h,i)perylene. If a Tier II validation were performed, the following actions would be applied to these analytes in sample EP0134: results would be estimated (J/UJ). 1,4 Naphthoquinone and 4-nitroquinoline-1-oxide are not target analytes. The percent recovery for Bis(2-chloroethyl)ether was above QC limits. If a Tier II validation were performed, positive results would be estimated (J) and non-detects would be accepted in sample EP0134.

The following compounds were spiked but not recovered in EP0144: Phenol, 3,3'-dichlorobenzidine, 4-nitrophenol, 4-nitroquinoline-1-oxide, benzoic acid, and benzidine. The first three compounds are target analytes for the project and the last two are not. These

compounds would be flagged as estimated (J) for detections and rejected (R) for non-detects in the associated sample (EP0144).

The following compounds could not be calculated due to a 0% recovery in sample EP0157: 3,3-Dichlorobenzidine, 4-nitroquiniline-1-oxide, and Benzidine. If a Tier II validation were performed, the following actions would be applied to the analytes: positive results would have been estimated (J) and non-detected results rejected (R) in sample EP0157. 4-nitroquiniline-1-oxide and Benzidine are not target analytes. The spike recovery result for N-Nitrosodiphenylamine was less than 10% and therefore positive detects for this compound would be estimated (J) and non-detects would be rejected (R) in sample EP0157.

#### Anions:

The matrix spike percent recovery for Nitrate and Nitrite exceeded the QC limits in sample EP0138. If a Tier II validation were performed, positive results for Nitrate and Nitrite would be estimated (J) and non-detects would be accepted in samples EP0132-EP0138.

The matrix spike percent recovery for Nitrate exceeded the QC limits in sample EP0144. If a Tier II validation were performed, positive results for Nitrate would be estimated (J) and non-detects would be accepted in samples EP0144-EP0147.

The percent recovery for Nitrate exceeded the QC limits in sample EP0149. In a Tier II validation, detects for Nitrate would be estimated (J) and non-detects would be accepted in samples EP0149-EP0153.

The matrix spike percent recovery for Nitrite exceeded the QC limits in sample EP0157. If a Tier II validation were performed, positive results for Nitrite would be estimated (J) and non-detects would be accepted in samples EP0154-EP0157.

#### **Conclusions**

All VOC, 1,4-dioxane, metals, mercury, and anion data are usable. Some qualification of results is warranted based on issues addressed above. There were several instances where SVOC data would be rejected based on LCS and matrix spike results. Eleven SVOC compounds had some rejected data. Of those eleven compounds five were not on the project target analyte list. These data are summarized in the attached table. All other SVOC data are usable for this project.

Please contact Gail DeRuzzo at (978) 703-6021 should you have any questions or comments regarding this information.

Very truly yours,

NOBIS ENGINEERING, INC.



---

Gail DeRuzzo  
Lead Chemist

Tables:      SVOC Rejection Data  
                Data Summary Tables

Enclosures:    Data Review Checklists  
                  Field Sampling Notes and COC  
                  DQO Summary

**A  
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I  
X  
C**

Report Date:  
29-Dec-10 15:30

- Final Report  
 Re-Issued Report  
 Revised Report



**SPECTRUM ANALYTICAL, INC.**  
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**HANIBAL TECHNOLOGY**  
**Laboratory Report**

CEA, Inc.  
127 Hartwell Street, Suite 2  
West Boylston, MA 01583  
Attn: Jason Frigon

Project: Nyanza Chemical Waste Dump - Ashland, MA  
Project #: 6883-09-0004

<b>Laboratory ID</b>	<b>Client Sample ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
SB22313-01	NCWD-GW-DEP-MW-1-12-9-10	Ground Water	09-Dec-10 09:17	10-Dec-10 17:00
SB22313-02	NCWD-GW-DEP-MW-2-12-9-10	Ground Water	09-Dec-10 10:23	10-Dec-10 17:00
SB22313-03	NCWD-GW-DEP-MW-3-12-9-10	Ground Water	09-Dec-10 11:37	10-Dec-10 17:00
SB22313-04	NCWD-GW-DEP-MW-4-12-9-10	Ground Water	09-Dec-10 13:33	10-Dec-10 17:00
SB22313-05	NCWD-GW-DUP-12-9-10	Ground Water	09-Dec-10 00:00	10-Dec-10 17:00
SB22313-06	NCWD-GW-TB-12-9-10	Water	09-Dec-10 00:00	10-Dec-10 17:00

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.

All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110  
Connecticut # PH-0777  
Florida # E87600/E87936  
Maine # MA138  
New Hampshire # 2538  
New Jersey # MA011/MA012  
New York # 11393/11840  
Pennsylvania # 68-04426/68-02924  
Rhode Island # 98  
USDA # S-51435

Authorized by:

Hanibal C. Tayeh, Ph.D.  
President/Laboratory Director

Technical Reviewer's Initial:



Spectrum Analytical holds certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes.

Please note that this report contains 19 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

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## CASE NARRATIVE:

The sample temperature upon receipt by Spectrum Analytical courier was recorded as 3.2 degrees Celsius. The condition of these samples was further noted as received on ice. The samples were transported on ice to the laboratory facility and the temperature was recorded at 0.6 degrees Celsius upon receipt at the laboratory. Please refer to the Chain of Custody for details specific to sample receipt times.

An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method. Regulatory limits may not be achieved if specific method and/or technique was not requested on the Chain of Custody.

According to WSC-CAM 5/2009 Rev.1, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended recovery range, a range has been set based on historical control limits.

Some target analytes which are not listed as exceptions in the Summary of CAM Reporting Limits may exceed the recommended RL based on sample initial volume or weight provided, % moisture content, or responsiveness of a particular analyte to purge and trap instrumentation.

**See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.**

## SW846 8260B/C

### Calibration:

1012004

Analyte quantified by quadratic equation type calibration.

1,2-Dibromo-3-chloropropane  
cis-1,3-Dichloropropene  
Dibromochloromethane  
trans-1,3-Dichloropropene

This affected the following samples:

NCWD-GW-DEP-MW-1-12-9-10  
NCWD-GW-DEP-MW-2-12-9-10  
NCWD-GW-DEP-MW-3-12-9-10  
NCWD-GW-DEP-MW-4-12-9-10  
NCWD-GW-DUP-12-9-10  
NCWD-GW-TB-12-9-10

### Spikes:

1026260-MS1      *Source: SB22313-02*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

1,1,1-Trichloroethane

### Samples:

S011342-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

1,1,1-Trichloroethane (24.3%)

**SW846 8260B/C**

**Samples:**

S011342-CCV1

---

This affected the following samples:

1026260-BLK1  
1026260-BS1  
1026260-BSD1  
1026260-MS1  
1026260-MSD1  
NCWD-GW-DEP-MW-1-12-9-10  
NCWD-GW-DEP-MW-2-12-9-10  
NCWD-GW-DEP-MW-3-12-9-10  
NCWD-GW-DEP-MW-4-12-9-10  
NCWD-GW-DUP-12-9-10  
NCWD-GW-TB-12-9-10

SB22313-01                  *NCWD-GW-DEP-MW-1-12-9-10*

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Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

Sample IdentificationNCWD-GW-DEP-MW-1-12-9-10  
SB22313-01Client Project #  
6883-09-0004Matrix  
Ground WaterCollection Date/Time  
09-Dec-10 09:17Received  
10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
Prepared by method SW846 5030 Water MS												
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	BRL		µg/l	5.0	5	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
67-64-1	Acetone	BRL		µg/l	50.0	5	"	"	"	"	"	
107-13-1	Acrylonitrile	BRL		µg/l	2.5	5	"	"	"	"	"	
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"	
108-86-1	Bromobenzene	BRL		µg/l	5.0	5	"	"	"	"	"	
74-97-5	Bromoform	BRL		µg/l	5.0	5	"	"	"	"	"	
75-27-4	Bromochloromethane	BRL		µg/l	2.5	5	"	"	"	"	"	
75-25-2	Bromodichloromethane	BRL		µg/l	5.0	5	"	"	"	"	"	
74-83-9	Bromomethane	BRL		µg/l	10.0	5	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL		µg/l	50.0	5	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL		µg/l	10.0	5	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL		µg/l	5.0	5	"	"	"	"	"	
108-90-7	Chlorobenzene	33.4		µg/l	5.0	5	"	"	"	"	"	
75-00-3	Chloroethane	BRL		µg/l	10.0	5	"	"	"	"	"	
67-66-3	Chloroform	BRL		µg/l	5.0	5	"	"	"	"	"	
74-87-3	Chloromethane	BRL		µg/l	10.0	5	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL		µg/l	5.0	5	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL		µg/l	5.0	5	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	10.0	5	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL		µg/l	2.5	5	"	"	"	"	"	
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	2.5	5	"	"	"	"	"	
74-95-3	Dibromomethane	BRL		µg/l	5.0	5	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	47.6		µg/l	5.0	5	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	5.0	5	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	10.4		µg/l	5.0	5	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	10.0	5	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL		µg/l	5.0	5	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL		µg/l	5.0	5	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL		µg/l	5.0	5	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	53.1		µg/l	5.0	5	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	5.0	5	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL		µg/l	5.0	5	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL		µg/l	5.0	5	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL		µg/l	5.0	5	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL		µg/l	5.0	5	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	2.5	5	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	2.5	5	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL		µg/l	2.5	5	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL		µg/l	50.0	5	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	

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\* Reportable Detection Limit

BRL = Below Reporting Limit

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Sample Identification

**NCWD-GW-DEP-MW-1-12-9-10**  
SB22313-01

Client Project #  
6883-09-0004Matrix  
Ground WaterCollection Date/Time  
09-Dec-10 09:17Received  
10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
GS1 <u>Prepared by method SW846 5030 Water MS</u>												
99-87-6	4-Isopropyltoluene	BRL		µg/l	5.0	5	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	50.0	5	"	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	10.0	5	"	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	5.0	5	"	"	"	"	"	"
630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	5.0	5	"	"	"	"	"	"
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	2.5	5	"	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL		µg/l	5.0	5	"	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	5.9		µg/l	5.0	5	"	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	15.3		µg/l	5.0	5	"	"	"	"	"	"
108-70-3	1,3,5-Trichlorobenzene	BRL		µg/l	5.0	5	"	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	5.0	5	"	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	5.0	5	"	"	"	"	"	"
79-01-6	Trichloroethene	130		µg/l	5.0	5	"	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	5.0	5	"	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	5.0	5	"	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	5.0	5	"	"	"	"	"	"
179601-23-1	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	10.0	5	"	"	"	"	"	"
60-29-7	Ethyl ether	BRL		µg/l	5.0	5	"	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	5.0	5	"	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	5.0	5	"	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	50.0	5	"	"	"	"	"	"
123-91-1	1,4-Dioxane	BRL		µg/l	100	5	"	"	"	"	"	"
110-57-6	trans-1,4-Dichloro-2-butene	BRL		µg/l	25.0	5	"	"	"	"	"	"
64-17-5	Ethanol	BRL		µg/l	2000	5	"	"	"	"	"	"
<i>Surrogate recoveries:</i>												
460-00-4	4-Bromofluorobenzene	96			70-130 %		"	"	"	"	"	"
2037-26-5	Toluene-d8	98			70-130 %		"	"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	108			70-130 %		"	"	"	"	"	"
1868-53-7	Dibromofluoromethane	95			70-130 %		"	"	"	"	"	"

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Sample IdentificationNCWD-GW-DEP-MW-2-12-9-10  
SB22313-02Client Project #  
6883-09-0004Matrix  
Ground WaterCollection Date/Time  
09-Dec-10 10:23Received  
10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	naa	1026260	
67-64-1	Acetone	BRL		µg/l	10.0	1	"	"	"	"	"	"
107-13-1	Acrylonitrile	1.8		µg/l	0.5	1	"	"	"	"	"	"
71-43-2	Benzene	1.2		µg/l	1.0	1	"	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	2.0	1	"	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-90-7	Chlorobenzene	38.3		µg/l	1.0	1	"	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	2.0	1	"	"	"	"	"	"
124-48-1	Dibromochloromethane	0.5		µg/l	0.5	1	"	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	0.6		µg/l	0.5	1	"	"	"	"	"	"
74-95-3	Dibromomethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-50-1	1,2-Dichlorobenzene	58.6		µg/l	1.0	1	"	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	2.2		µg/l	1.0	1	"	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	13.4		µg/l	1.0	1	"	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	2.0	1	"	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	25.4		µg/l	1.0	1	"	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
142-28-9	1,3-Dichloropropane	0.5		µg/l	1.0	1	"	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	1.0	1	"	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-68-3	Hexachlorobutadiene	0.6		µg/l	0.5	1	"	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"

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\* Reportable Detection Limit

BRL = Below Reporting Limit

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Sample IdentificationNCWD-GW-DEP-MW-2-12-9-10  
SB22313-02Client Project #  
6883-09-0004Matrix  
Ground WaterCollection Date/Time  
09-Dec-10 10:23Received  
10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
99-87-6	4-Isopropyltoluene	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	naa	1026260	
1634-04-4	Methyl tert-butyl ether	1.1		µg/l	1.0	1	"	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	2.0	1	"	"	"	"	"	"
91-20-3	Naphthalene	1.4		µg/l	1.0	1	"	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	1.0	1	"	"	"	"	"	"
630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-34-5	1,1,2,2-Tetrachloroethane	0.9		µg/l	0.5	1	"	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	8.1		µg/l	1.0	1	"	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	24.4		µg/l	1.0	1	"	"	"	"	"	"
108-70-3	1,3,5-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-01-6	Trichloroethene	64.8		µg/l	1.0	1	"	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	1.4		µg/l	1.0	1	"	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
179601-23-1	m,p-Xylene	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	1.0	1	"	"	"	"	"	"
109-99-9	Tetrahydrofuran	2.1		µg/l	2.0	1	"	"	"	"	"	"
60-29-7	Ethyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	1.2		µg/l	1.0	1	"	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	24.5		µg/l	10.0	1	"	"	"	"	"	"
123-91-1	1,4-Dioxane	27.7		µg/l	20.0	1	"	"	"	"	"	"
110-57-6	trans-1,4-Dichloro-2-butene	BRL		µg/l	5.0	1	"	"	"	"	"	"
64-17-5	Ethanol	BRL		µg/l	400	1	"	"	"	"	"	"

**Surrogate recoveries:**

460-00-4	4-Bromofluorobenzene	98	70-130 %	"	"	"	"	"
2037-26-5	Toluene-d8	98	70-130 %	"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	115	70-130 %	"	"	"	"	"
1868-53-7	Dibromofluoromethane	98	70-130 %	"	"	"	"	"

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Sample IdentificationNCWD-GW-DEP-MW-3-12-9-10  
SB22313-03Client Project #  
6883-09-0004Matrix  
Ground WaterCollection Date/Time  
09-Dec-10 11:37Received  
10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
67-64-1	Acetone	BRL		µg/l	10.0	1	"	"	"	"	"	"
107-13-1	Acrylonitrile	BRL		µg/l	0.5	1	"	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	2.0	1	"	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	2.0	1	"	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"	"
74-95-3	Dibromomethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-50-1	1,2-Dichlorobenzene	0.8		µg/l	1.0	1	"	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	2.0	1	"	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	1.0	1	"	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"

This laboratory report is not valid without an authorized signature on the cover page.

Sample IdentificationNCWD-GW-DEP-MW-3-12-9-10  
SB22313-03Client Project #  
6883-09-0004Matrix  
Ground WaterCollection Date/Time  
09-Dec-10 11:37Received  
10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
99-87-6	4-Isopropyltoluene	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	2.0	1	"	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	1.0	1	"	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	1.0	1	"	"	"	"	"	"
630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	0.5		µg/l	1.0	1	"	"	"	"	"	"
108-70-3	1,3,5-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
179601-23-1	m,p-Xylene	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	1.0	1	"	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	2.0	1	"	"	"	"	"	"
60-29-7	Ethyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"	"
123-91-1	1,4-Dioxane	BRL		µg/l	20.0	1	"	"	"	"	"	"
110-57-6	trans-1,4-Dichloro-2-butene	BRL		µg/l	5.0	1	"	"	"	"	"	"
64-17-5	Ethanol	BRL		µg/l	400	1	"	"	"	"	"	"

## Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	97	70-130 %	"	"	"	"	"
2037-26-5	Toluene-d8	97	70-130 %	"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	110	70-130 %	"	"	"	"	"
1868-53-7	Dibromofluoromethane	91	70-130 %	"	"	"	"	"

Sample IdentificationNCWD-GW-DEP-MW-4-12-9-10  
SB22313-04Client Project #  
6883-09-0004Matrix  
Ground WaterCollection Date/Time  
09-Dec-10 13:33Received  
10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
67-64-1	Acetone	BRL		µg/l	10.0	1	"	"	"	"	"	"
107-13-1	Acrylonitrile	BRL		µg/l	0.5	1	"	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	2.0	1	"	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	2.0	1	"	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"	"
74-95-3	Dibromomethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-50-1	1,2-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	2.0	1	"	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	1.0	1	"	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"

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\* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 19

Sample Identification

**NCWD-GW-DEP-MW-4-12-9-10**  
SB22313-04

**Client Project #**  
6883-09-0004

**Matrix**  
Ground Water

**Collection Date/Time**  
09-Dec-10 13:33

**Received**  
10-Dec-10

<b>CAS No.</b>	<b>Analyte(s)</b>	<b>Result</b>	<b>Flag</b>	<b>Units</b>	<b>*RDL</b>	<b>Dilution</b>	<b>Method Ref.</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Analyst</b>	<b>Batch</b>	<b>Cert.</b>
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
99-87-6	4-Isopropyltoluene	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	2.0	1	"	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	1.0	1	"	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	1.0	1	"	"	"	"	"	"
630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-70-3	1,3,5-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
179601-23-1	m,p-Xylene	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	1.0	1	"	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	2.0	1	"	"	"	"	"	"
60-29-7	Ethyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"	"
123-91-1	1,4-Dioxane	BRL		µg/l	20.0	1	"	"	"	"	"	"
110-57-6	trans-1,4-Dichloro-2-butene	BRL		µg/l	5.0	1	"	"	"	"	"	"
64-17-5	Ethanol	BRL		µg/l	400	1	"	"	"	"	"	"

**Surrogate recoveries:**

460-00-4	4-Bromofluorobenzene	97	70-130 %	"	"	"	"	"
2037-26-5	Toluene-d8	98	70-130 %	"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	108	70-130 %	"	"	"	"	"
1868-53-7	Dibromofluoromethane	94	70-130 %	"	"	"	"	"

*This laboratory report is not valid without an authorized signature on the cover page.*

Sample Identification

NCWD-GW-DUP-12-9-10

SB22313-05

Client Project #

6883-09-0004

Matrix

Ground Water

Collection Date/Time

09-Dec-10 00:00

Received

10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
67-64-1	Acetone	BRL		µg/l	10.0	1	"	"	"	"	"	"
107-13-1	Acrylonitrile	BRL		µg/l	0.5	1	"	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	2.0	1	"	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	2.0	1	"	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"	"
74-95-3	Dibromomethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-50-1	1,2-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	2.0	1	"	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	1.0	1	"	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"

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\* Reportable Detection Limit

BRL = Below Reporting Limit

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Sample Identification

NCWD-GW-DUP-12-9-10

SB22313-05

Client Project #

6883-09-0004

Matrix

Ground Water

Collection Date/Time

09-Dec-10 00:00

Received

10-Dec-10

**CAS No.****Analyte(s)****Result****Flag****Units****\*RDL****Dilution****Method Ref.****Prepared****Analyzed****Analyst****Batch****Cert.****Volatile Organic Compounds****Volatile Organic Compounds**

Prepared by method SW846 5030 Water MS

99-87-6	4-Isopropyltoluene	BRL	µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260
1634-04-4	Methyl tert-butyl ether	BRL	µg/l	1.0	1	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	µg/l	10.0	1	"	"	"	"	"
75-09-2	Methylene chloride	BRL	µg/l	2.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL	µg/l	1.0	1	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL	µg/l	1.0	1	"	"	"	"	"
100-42-5	Styrene	BRL	µg/l	1.0	1	"	"	"	"	"
630-20-6	1,1,1,2-Tetrachloroethane	BRL	µg/l	1.0	1	"	"	"	"	"
79-34-5	1,1,2,2-Tetrachloroethane	BRL	µg/l	0.5	1	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL	µg/l	1.0	1	"	"	"	"	"
108-88-3	Toluene	BRL	µg/l	1.0	1	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL	µg/l	1.0	1	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL	µg/l	1.0	1	"	"	"	"	"
108-70-3	1,3,5-Trichlorobenzene	BRL	µg/l	1.0	1	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL	µg/l	1.0	1	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL	µg/l	1.0	1	"	"	"	"	"
79-01-6	Trichloroethene	BRL	µg/l	1.0	1	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	µg/l	1.0	1	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL	µg/l	1.0	1	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL	µg/l	1.0	1	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL	µg/l	1.0	1	"	"	"	"	"
75-01-4	Vinyl chloride	BRL	µg/l	1.0	1	"	"	"	"	"
179601-23-1	m,p-Xylene	BRL	µg/l	2.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL	µg/l	1.0	1	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL	µg/l	2.0	1	"	"	"	"	"
60-29-7	Ethyl ether	BRL	µg/l	1.0	1	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL	µg/l	1.0	1	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL	µg/l	1.0	1	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL	µg/l	1.0	1	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL	µg/l	10.0	1	"	"	"	"	"
123-91-1	1,4-Dioxane	BRL	µg/l	20.0	1	"	"	"	"	"
110-57-6	trans-1,4-Dichloro-2-butene	BRL	µg/l	5.0	1	"	"	"	"	"
64-17-5	Ethanol	BRL	µg/l	400	1	"	"	"	"	"

**Surrogate recoveries:**

460-00-4	4-Bromofluorobenzene	98	70-130 %	"	"	"	"	"	"	"
2037-26-5	Toluene-d8	97	70-130 %	"	"	"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	108	70-130 %	"	"	"	"	"	"	"
1868-53-7	Dibromofluoromethane	97	70-130 %	"	"	"	"	"	"	"

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\* Reportable Detection Limit

BRL = Below Reporting Limit

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Sample Identification

NCWD-GW-TB-12-9-10

SB22313-06

Client Project #

6883-09-0004

Matrix

Water

Collection Date/Time

09-Dec-10 00:00

Received

10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
67-64-1	Acetone	BRL		µg/l	10.0	1	"	"	"	"	"	"
107-13-1	Acrylonitrile	BRL		µg/l	0.5	1	"	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	2.0	1	"	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	1.0	1	"	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	2.0	1	"	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"	"
74-95-3	Dibromomethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-50-1	1,2-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	2.0	1	"	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	1.0	1	"	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"

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\* Reportable Detection Limit

BRL = Below Reporting Limit

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Sample Identification

NCWD-GW-TB-12-9-10

SB22313-06

Client Project #

6883-09-0004

Matrix

Water

Collection Date/Time

09-Dec-10 00:00

Received

10-Dec-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
<b>Volatile Organic Compounds</b>												
<b>Volatile Organic Compounds</b>												
<b>Prepared by method SW846 5030 Water MS</b>												
99-87-6	4-Isopropyltoluene	BRL		µg/l	1.0	1	SW846 8260B/C	17-Dec-10	18-Dec-10	EQ	1026260	
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	2.0	1	"	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	1.0	1	"	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	1.0	1	"	"	"	"	"	"
630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	1.0	1	"	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-70-3	1,3,5-Trichlorobenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	1.0	1	"	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	1.0	1	"	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	1.0	1	"	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	1.0	1	"	"	"	"	"	"
179601-23-1	m,p-Xylene	BRL		µg/l	2.0	1	"	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	1.0	1	"	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	2.0	1	"	"	"	"	"	"
60-29-7	Ethyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	1.0	1	"	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"	"
123-91-1	1,4-Dioxane	BRL		µg/l	20.0	1	"	"	"	"	"	"
110-57-6	trans-1,4-Dichloro-2-butene	BRL		µg/l	5.0	1	"	"	"	"	"	"
64-17-5	Ethanol	BRL		µg/l	400	1	"	"	"	"	"	"

## Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	95	70-130 %	"	"	"	"	"
2037-26-5	Toluene-d8	97	70-130 %	"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	115	70-130 %	"	"	"	"	"
1868-53-7	Dibromofluoromethane	101	70-130 %	"	"	"	"	"

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\* Reportable Detection Limit

BRL = Below Reporting Limit

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### Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch 1026260 - SW846 5030 Water MS</b>										
<u><b>Blank (1026260-BLK1)</b></u>										
Benzene	BRL		µg/l		1.0					
Chlorobenzene	BRL		µg/l		1.0					
1,1-Dichloroethene	BRL		µg/l		1.0					
cis-1,2-Dichloroethene	BRL		µg/l		1.0					
trans-1,2-Dichloroethene	BRL		µg/l		1.0					
Methylene chloride	BRL		µg/l		2.0					
Tetrachloroethene	BRL		µg/l		1.0					
Toluene	BRL		µg/l		1.0					
1,1,1-Trichloroethane	BRL		µg/l		1.0					
Trichloroethene	BRL		µg/l		1.0					
m,p-Xylene	BRL		µg/l		2.0					
o-Xylene	BRL		µg/l		1.0					
<u><b>LCS (1026260-BS1)</b></u>										
Benzene	18.7		µg/l		20.0		93	70-130		25
Chlorobenzene	17.3		µg/l		20.0		86	70-130		25
1,1-Dichloroethene	19.1		µg/l		20.0		95	70-130		25
cis-1,2-Dichloroethene	19.0		µg/l		20.0		95	70-130		25
trans-1,2-Dichloroethene	19.3		µg/l		20.0		97	70-130		25
Methylene chloride	19.0		µg/l		20.0		95	70-130		25
Tetrachloroethene	18.6		µg/l		20.0		93	70-130		25
Toluene	19.1		µg/l		20.0		96	70-130		25
1,1,1-Trichloroethane	22.7		µg/l		20.0		114	70-130		25
Trichloroethene	20.0		µg/l		20.0		100	70-130		25
m,p-Xylene	38.5		µg/l		40.0		96	70-130		25
o-Xylene	18.6		µg/l		20.0		93	70-130		25
<u><b>LCS Dup (1026260-BSD1)</b></u>										
Benzene	18.6		µg/l		20.0		93	70-130	0.4	25
Chlorobenzene	17.5		µg/l		20.0		88	70-130	1	25
1,1-Dichloroethene	19.2		µg/l		20.0		96	70-130	0.5	25
cis-1,2-Dichloroethene	18.6		µg/l		20.0		93	70-130	2	25
trans-1,2-Dichloroethene	18.8		µg/l		20.0		94	70-130	3	25
Methylene chloride	18.2		µg/l		20.0		91	70-130	4	25
Tetrachloroethene	17.7		µg/l		20.0		88	70-130	5	25
Toluene	18.6		µg/l		20.0		93	70-130	3	25
1,1,1-Trichloroethane	22.4		µg/l		20.0		112	70-130	1	25
Trichloroethene	18.6		µg/l		20.0		93	70-130	7	25
m,p-Xylene	37.7		µg/l		40.0		94	70-130	2	25
o-Xylene	18.7		µg/l		20.0		93	70-130	0.3	25
<u><b>Surrogate: 4-Bromofluorobenzene</b></u>										
Surrogate: Toluene-d8	30.1		µg/l		30.0		100	70-130		
Surrogate: 1,2-Dichloroethane-d4	30.5		µg/l		30.0		102	70-130		
Surrogate: Dibromofluoromethane	33.6		µg/l		30.0		112	70-130		
Surrogate: 4-Bromofluorobenzene	29.7		µg/l		30.0		99	70-130		

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### Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch 1026260 - SW846 5030 Water MS</b>										
<u><b>Matrix Spike (1026260-MS1)</b></u>										
<u><b>Source: SB22313-02</b></u>										
Benzene	21.9		µg/l		20.0	1.2	104	70-130		30
Chlorobenzene	56.6		µg/l		20.0	38.3	91	70-130		30
1,1-Dichloroethene	21.7		µg/l		20.0	BRL	108	70-130		30
cis-1,2-Dichloroethene	47.0		µg/l		20.0	25.4	108	70-130		30
trans-1,2-Dichloroethene	20.6		µg/l		20.0	0.6	100	70-130		30
Methylene chloride	20.4		µg/l		20.0	BRL	102	70-130		30
Tetrachloroethene	21.2		µg/l		20.0	BRL	106	70-130		30
Toluene	21.0		µg/l		20.0	BRL	105	70-130		30
1,1,1-Trichloroethane	26.9	QM7	µg/l		20.0	BRL	134	70-130		30
Trichloroethene	89.4		µg/l		20.0	64.8	123	70-130		30
m,p-Xylene	42.2		µg/l		40.0	BRL	105	70-130		30
o-Xylene	20.3		µg/l		20.0	BRL	102	70-130		30
<i>Surrogate: 4-Bromofluorobenzene</i>	30.5		µg/l		30.0		102	70-130		
<i>Surrogate: Toluene-d8</i>	30.5		µg/l		30.0		102	70-130		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	33.6		µg/l		30.0		112	70-130		
<i>Surrogate: Dibromofluoromethane</i>	29.9		µg/l		30.0		100	70-130		
<u><b>Matrix Spike Dup (1026260-MSD1)</b></u>										
<u><b>Source: SB22313-02</b></u>										
Benzene	17.8		µg/l		20.0	1.2	83	70-130	22	30
Chlorobenzene	52.8		µg/l		20.0	38.3	72	70-130	23	30
1,1-Dichloroethene	16.9		µg/l		20.0	BRL	85	70-130	25	30
cis-1,2-Dichloroethene	42.7		µg/l		20.0	25.4	86	70-130	22	30
trans-1,2-Dichloroethene	16.9		µg/l		20.0	0.6	81	70-130	21	30
Methylene chloride	16.3		µg/l		20.0	BRL	82	70-130	22	30
Tetrachloroethene	16.8		µg/l		20.0	BRL	84	70-130	23	30
Toluene	17.1		µg/l		20.0	BRL	86	70-130	21	30
1,1,1-Trichloroethane	21.6		µg/l		20.0	BRL	108	70-130	22	30
Trichloroethene	83.7		µg/l		20.0	64.8	95	70-130	26	30
m,p-Xylene	34.2		µg/l		40.0	BRL	86	70-130	21	30
o-Xylene	16.8		µg/l		20.0	BRL	84	70-130	19	30
<i>Surrogate: 4-Bromofluorobenzene</i>	30.5		µg/l		30.0		102	70-130		
<i>Surrogate: Toluene-d8</i>	30.0		µg/l		30.0		100	70-130		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	34.4		µg/l		30.0		115	70-130		
<i>Surrogate: Dibromofluoromethane</i>	29.7		µg/l		30.0		99	70-130		

*This laboratory report is not valid without an authorized signature on the cover page.*

## Notes and Definitions

GS1	Sample dilution required for high concentration of target analytes to be within the instrument calibration range.
QM7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
BRL	Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

**Laboratory Control Sample (LCS):** A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

**Matrix Duplicate:** An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

**Matrix Spike:** An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

**Method Blank:** An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

**Method Detection Limit (MDL):** The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

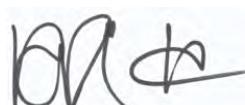
**Reportable Detection Limit (RDL):** The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

**Surrogate:** An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

**Continuing Calibration Verification:** The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.

Validated by:  
Hanibal C. Tayeh, Ph.D.  
Nicole Leja

# MassDEP Analytical Protocol Certification Form

<b>Laboratory Name:</b> Spectrum Analytical, Inc.		<b>Project #:</b> 6883-09-0004			
<b>Project Location:</b> Nyanza Chemical Waste Dump - Ashland, MA		<b>RTN:</b>			
<b>This form provides certifications for the following data set:</b>		SB22313-01 through SB22313-06			
<b>Matrices:</b> Ground Water Water					
<b>CAM Protocol</b>					
<input checked="" type="checkbox"/> 8260 VOC CAM II A	7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
6010 Metals CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B	
<i>Affirmative responses to questions A through F are required for "Presumptive Certainty" status</i>					
<b>A</b>	Were all samples received in a condition consistent with those described on the Chain of Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?			<input checked="" type="checkbox"/> Yes	No
<b>B</b>	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?			<input checked="" type="checkbox"/> Yes	No
<b>C</b>	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?			<input checked="" type="checkbox"/> Yes	No
<b>D</b>	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?			<input checked="" type="checkbox"/> Yes	No
<b>E</b>	a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?			Yes	No
<b>F</b>	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to questions A through E)?			<input checked="" type="checkbox"/> Yes	No
<i>Responses to questions G, H and I below are required for "Presumptive Certainty" status</i>					
<b>G</b>	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?			Yes	<input checked="" type="checkbox"/> No
<i>Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.</i>					
<b>H</b>	Were all QC performance standards specified in the CAM protocol(s) achieved?			Yes	<input checked="" type="checkbox"/> No
<b>I</b>	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?			Yes	<input checked="" type="checkbox"/> No
<i>All negative responses are addressed in a case narrative on the cover page of this report.</i>					
<i>I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.</i>					
					
Hanibal C. Tayeh, Ph.D. President/Laboratory Director Date: 12/29/2010					

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# CHAIN OF CUSTODY RECORD

SB 22313 e

## Special Handling:

- Standard TAT - 7 to 10 business days  
 Rush TAT - Date Needed:  
 • All TAT's subject to laboratory approval.  
 • Min. 24-hour notification needed for rushes.  
 • All samples are disposed of after 60 days unless otherwise instructed.

Page 1 of 1.

Report To: CEA 127 Hartwell Street West Boylston, MA 01583		Invoice To: CEA <i>(Special pricing)</i>		Project No.6883-09-0004								
				MA.DEP								
				Nyanza Chemical Waste Dump								
				Ashland Ma.								
				<i>Sampler: MARK HAGUE</i>								
1=Na <sub>2</sub> SO <sub>3</sub> 2=HCl    3=H <sub>2</sub> SO <sub>4</sub> 4=HNO <sub>3</sub> 5=NaOH    6=Ascorbic Acid 7=CH <sub>3</sub> OH    8=NaHSO <sub>4</sub> 9=                  10=				Containers:								
				Analyses:								
				Notes:								
DW=Drinking Water    GW=Groundwater    WW=Wastewater O=Oil    SW= Surface Water    SO=Soil    SL=Sludge    A=Air X1= _____ X2= _____ X3= _____				Special Spectrum Pricing <i>* PROVIDE MCP CAM REPORT</i>								
G= Grab    C= Composite												
Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	BPA & ZCOB	MS/MSD
22313-01	NCWD-GW-DEP-MW-1 - 12-9-10	12/9/10	0917	G	GW	Z	2				X	
02	NCWD-GW-DEP-MW-2 - 12-9-10		1023	G		Z	3				X	
03	NCWD-GW-DEP-MW-3 - 12-9-10		1137	G		Z	3				X	
04	NCWD-GW-DEP-MW-4 - 12-9-10		1333	G		Z	3				X	
C	NCWD-GW-DEP-MW- - 12-9-10											M, H-
	NCWD-GW-DEP-MW- - 12-9-10											M, H,
05	NCWD-GW-DUP-12-9-19	12/9/10	-	G	GW	Z	3				X	
06	NCWD-GW-TB-12/9/10	12/9/10	-	G	W	Z	2				X	
				Relinquished by:		Received by:		Date:		Time:		
				<i>JFRISON@CEA-INC.COM</i>		<i>Mark Hague</i>		<i>Bob Koenig</i>		12/10/10 1203		
				<i>Mark Hague</i>		<i>Deborah</i>				12/10/10 17:00		
<i>Fax results when available to (508) 835-8822</i> <i>E-mail results when available to dazkathes@cea-inc.com</i> <i>Conditions upon Receipt: <input checked="" type="checkbox"/> Lead <input type="checkbox"/> Ambient <input checked="" type="checkbox"/> 3.20</i>												

0.4